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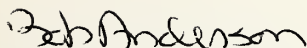
U.S. DEPARTMENT OF AGRICULTURE
MONTANA DEPARTMENT OF NATURAL
RESOURCES AND CONSERVATION

DRAFT ENVIRONMENTAL IMPACT STATEMENT
**PROPOSED 115-kV TRANSMISSION LINE
FROM TROY TO MOUNT VERNON MINE**

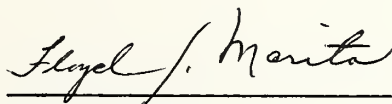
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September 1978



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CONTENTS

FIGURES.	v
TABLES	vi
MAJOR RESULTS AND CONCLUSIONS.	1
Need for and Alternatives to the Proposed Line	1
Environmental Concerns and Impacts.	2
Alternative Routes	4
CHAPTER 1. INTRODUCTION	7
Applicable Statutes and Permits Required	7
History and Description of Proposed Action	8
Description of the Proposed Line and Its Construction	11
Previous Work	12
Overview of the Study Area.	12
CHAPTER 2. APPROACH	15
CHAPTER 3. NEED AND SYSTEM ALTERNATIVES	19
Existing Electrical System and Utility Corridors	19
Need	19
Capacity	20
Reliability	24
System Alternatives	25
Local Generation Alternatives	27
Transmission Alternatives	28
CHAPTER 4. ENVIRONMENTAL CONCERNS AND IMPACTS	29
Vegetation	29
Inventory	29
Impacts and Mitigating Measures	30
Socioeconomic Attributes	35
Inventory	35
Impacts and Mitigating Measures	36
Aquatic Systems	44
Inventory	44
Impacts and Mitigating Measures	44

Land Use	46
Inventory	46
Impacts and Mitigating Measures	50
Visual Concerns	53
Wildlife	57
Inventory	57
Impacts and Mitigating Measures	58
Substrate Suitability	59
Ground Stability	60
Soil Erosion	63
Substrate Suitability on Alternate Routes	63
CHAPTER 5. EVALUATION OF ALTERNATIVE ROUTES	65
Potential Impacts of Alternative Segments to Each Concern	69
Vegetation	69
Socioeconomic Attributes	69
Aquatic Systems	70
Land Use	70
Visual Concerns	71
Wildlife	71
Substrate Suitability	72
Comparison of Alternative Routes	72
Applicant's Preferred Route	73
Applicant's Alternative Route	73
DNRC Eastern Alternative Route	74
DNRC Western Alternative Route	74
DNRC Combination Alternative Route	75
CHAPTER 6. SHORT-TERM AND LONG-TERM EFFECTS ON PRODUCTIVITY	77
CHAPTER 7. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES	79
CHAPTER 8. UNRESOLVED QUESTIONS	81
ACKNOWLEDGMENTS	83
APPENDIXES	
A. Transmission Line Application Submitted by Northern Lights, Inc.	85
B. Federal Land Policy and Management Act of 1976	109
C. Assessment of Environmental Factors Included in the Major Facility Siting Act	115
LITERATURE CITED	121

FIGURES

1	Study Area and Applicant's Preferred and Alternative Routes	9
2	Existing Overhead Power Distribution and Transmission Lines	21
3	Forest Habitat Types	31
4	Unemployment Rates: Lincoln County and Statewide Average, 1972-78	37
5	Land Use Patterns	47
6	Transportation Patterns	51
7	Visual Quality	55
8	Substrate Suitability	61
9	Alternative Routes	67

TABLES

1	Summary of Potential Impacts of the Proposed 115-kV Transmission Line	3
2	Itemized 1978 Costs for Diesel Generation	27
3	Description of Habitat Types Within the Study Area	33
4	Hypothetical Employment Sequence for the Proposed Transmission Line and ASARCO's Proposed Plant and Mine	39
5.	Comparison of Alternative Routes	66

MAJOR RESULTS AND CONCLUSIONS

This report investigates the environmental impacts which would result from the construction of a 115-kilovolt (kV) transmission line between Troy and the Mount Vernon Mine, a mine proposed by ASARCO, Inc. Northern Lights, Inc. (herein called the applicant), has applied to the Montana Department of Natural Resources and Conservation for permission to construct the transmission line, under the provisions of the Montana Major Facility Siting Act, the Montana Environmental Policy Act, and the National Environmental Policy Act. This report is the joint state-federal draft environmental impact statement required by these acts. After public comment on this draft, revisions will be made, a final impact statement published, and a report containing the DNRC's conclusions and recommendations sent to the Board of Natural Resources and Conservation for state action on the application. Appropriate federal action on the application will be taken by the U.S. Forest Service.

The impact study examined: (1) the need for and alternatives to the proposed line, (2) the line's potential environmental impacts ("environment" is here defined as including both natural elements, such as vegetation, wildlife, and water resources, and cultural elements, such as economics, employment, and land use.)--most importantly, impacts to vegetation and socio-economic attributes, and (3) the relative merits of alternative routes. The results and conclusions for each of these topics are summarized below.

NEED FOR AND ALTERNATIVES TO THE PROPOSED LINE

The proposed line would be approximately 27 km (17 mi) long and would for the most part run north-south along the Lake Creek Valley, a relatively flat, densely forested valley south of Troy, Lincoln County, northwestern Montana (see figure 1 on page 9). The valley is bounded to the east and west by mountains which rise abruptly and steeply from the valley floor. The proposed Mount Vernon Mine lies high in a mountain valley just west of Lake Creek Valley, and the applicant's preferred route leads up to the mine area by means of the steep Stanley Creek Valley.

The location of the proposed mine is fixed, and only three feasible existing sources of power--the Troy Substation to the north and the Noxon and Cabinet Gorge substations to the south--exist. The latter two were ruled out based on increased line length, construction costs, and environmental impacts (see chapter 3), leaving only the Troy-to-Mount Vernon Mine alternative. The relatively short length of the line and the steepness of the mountains bordering the Lake Creek Valley limit reasonable options for line placement to a single corridor along the Lake Creek and Stanley Creek valleys.

Reliability of service is not a major issue, probably because the cost of providing for extra reliability would outweigh the benefits of providing it. No backup service is proposed.

The question of need for the proposed line involves several considerations. One is the conditional nature of the load. If the mine and associated facilities open as proposed, there will be a demand for electricity; if they do not open, there will be no demand. Even if the facilities do open, conditions in the metals market would affect their profitability and, therefore, the likelihood of their continued operation. Given these potential uncertainties, the construction of the line would be risky in the absence of some guarantees to the utility. The risk would be dealt with by ASARCO's advance of the construction funds to the applicant and receipt of an annual credit against its electric bills.

A second consideration has to do with the size of the proposed line. The thermal carrying capacity of the proposed 115-kV line is around 60 kVA, which is three to four times the load it is supposed to carry for the mine and associated facilities. Thus, the load could be served at a lower voltage, with a consequent reduction in the cost of construction. The required investment in transformers would more than offset these savings.

The applicant proposes to upgrade an existing 12.47-kV line along part of its preferred route to 24.9 kV and underbuild it on the proposed 115-kV line. Since the 3-MW capacity of the existing line would not be reached for 25 to 30 years, insufficient capacity cannot be used as a justification for reconstruction. The larger line at 24.9 kV would suffice for an estimated 44 years.

On-site diesel generation is not economic in comparison with delivery of power from the Troy Substation to the mine via the proposed power line. Also considered was the possibility of construction of a hydroelectric facility on Stanley Creek. Insufficient hydropower is available to operate the loads of the proposed mine and concentrator.

ENVIRONMENTAL CONCERNS AND IMPACTS

Table 1 summarizes the line's potential impacts on the natural and cultural environment. There were no major impacts identified, and the only moderate impact was on vegetation cover, quantity, and quality.

There would be no significant irreversible or irretrievable effects of the proposed line.

There would be long-term commitments of land to the proposed line. For example, some forested land--including some highly productive commercial timber--would be taken out of production to accommodate access roads and the right-of-way. This initial loss of productive land could represent the beginning of a cumulative effect if further development continued to remove productive land from agricultural or forestry uses.

The effects of transmission lines on aesthetics are both immediate and

TABLE 1
SUMMARY OF POTENTIAL IMPACTS OF THE PROPOSED 115-KV TRANSMISSION LINE

	Major	Moderate	Minor	Negligible	Unknown
IMPACTS ON THE NATURAL ENVIRONMENT					
Air quality	-	-	x	-	-
Surface water quality, quantity, and distribution	-	-	x	-	-
Ground water quality, quantity, and distribution	-	-	-	x	-
Geology	-	-	-	x	-
Soil quality, stability, and moisture	-	-	-	x	-
Vegetation cover, quantity, and quality	-	x	-	-	-
Terrestrial fauna and habitats	-	-	x	-	-
Aquatic fauna and habitats	-	-	x	-	-
Rare or endangered plant or animal species and their habitat	-	-	-	x	-
Unique, endangered, fragile, or limited environmental resources	-	-	-	x	-
Demands on environmental resources of land, water, air, and energy	-	-	x	-	-
IMPACTS ON THE CULTURAL ENVIRONMENT					
Agricultural, commercial, or industrial production	-	-	x	-	-
Historical and archaeological sites	-	-	-	-	x
Access to and quality of recreational and wilderness activities	-	-	-	x	-
Natural beauty and aesthetics	-	-	x	-	-
Social structure and mores	-	-	-	x	-
Cultural uniqueness and diversity	-	-	-	x	-
Local and state tax base and tax revenues	-	-	x	-	-
Human health	-	-	-	x	-
Quantity and distribution of employment	-	-	-	x	-
Distribution and density of population and housing	-	-	-	-	-
Demands for local government services (school, water, health, police, etc.)	-	-	x	-	-
Locally adopted environmental plans and goals	-	-	-	x	-
Transportation networks and traffic flows	-	-	-	x	-
Demands for energy	-	-	-	x	-
Quantity and distribution of community and personal income	-	-	-	x	-

NOTE: An x denotes impact; a hyphen, no impact.

long term. While residents of the area may eventually become accustomed to the line's visual presence, their perception of the landscape would nevertheless be influenced because the line would detract from the landscape's scenic quality.

The proposed line would probably exist for as long as a need for electrical energy exists in the area, even beyond the projected 20-year life of the proposed Mount Vernon Mine if other ore bodies in the area were developed. The possible effects of increased power availability on future growth patterns in the Lake Creek Valley, while difficult to predict, deserve mention. Although the cause-and-effect relationship between growth and power availability is complex, it can be said that growth leads to a demand for increased power availability. In constructing the proposed line and supplying projected future power needs, a commitment is made to allow increased population density, increased use of energy, and continued land use change in the valley. All of these have significant long-term effects on the total environment of the valley.

ALTERNATIVE ROUTES

Figure 9 on page 67 shows all the alternative routes considered in this study. An initial elimination of the least desirable route segments left five routes, each feasible and each offering certain advantages for line construction. The DNRC's western alternative offers the shortest route between the Troy Substation and the proposed mine; the DNRC's eastern alternative uses existing right-of-way along Highway 56; and the DNRC's combination route uses some existing right-of-way and portions of the applicant's suggested routes. The applicant proposed the remaining two routes: a preferred and an alternative route.

These five alternatives are ranked in decreasing order of desirability and compared as follows:

Applicant's Preferred Route

The major advantage of this route is that it maximizes use of an existing 12.47-kV rural line, which would be upgraded to 24.9 kV and underbuilt on the 115-kV poles. This route would not minimize impact to landowners or the environment in any significant way other than through maximum use of a line which people are already accustomed to.

Selection of one of the alternative routes would not eliminate the existing transmission line or its impacts. Further, the opportunity would be lost for mitigating (by short reroutes) some of the minor visual and land use problems along the existing 12.47-kV line if an alternative route were chosen.

The use of the existing line gives this route a significant advantage over all other routes, considering all potential advantages and disadvantages.

Applicant's Alternative Route

This route requires the least length of new access roads and would have relatively low visual impact because it avoids heavily traveled Highway 56. The route would have relatively low impact on cropland and might reduce the cost of providing electrical service to recently subdivided land. These advantages are considered of minor significance (see table 1).

The route involves partial use of the existing Lake Creek 12.47-kV line and its right-of-way--an advantage of moderate significance.

DNRC Combination Route

In general, the impacts along this route are considered of minor significance. The route allows use of considerable length of existing rights-of-way in Lake Creek Valley but less than the applicant's preferred or alternate routes.

DNRC Western Alternative Route

This would be the shortest of all alternative routes. It would affect homeowners and aquatic systems the least of all routes and have low visual impacts. Steep sideslopes would pose some construction difficulties. These are considered minor advantages and disadvantages. The major disadvantages are that the route would use the least length of existing lines and would require the most new right-of-way.

Thus, the western alternative is ranked fourth in desirability, ahead only of the DNRC eastern route.

DNRC Eastern Alternative Route

This route would have nearly the least potential for using existing line rights-of-way. It would have relatively high impact to homeowners and significant visual impact. It would have the minor advantage of crossing no cropland.

None of these impacts or advantages are of more than minor significance. Except in that it crosses no cropland, the route has no clear advantage over other routes and in a number of types of impact is inferior to the others, making it least desirable.

CHAPTER ONE

INTRODUCTION

The Montana Environmental Policy Act (MEPA) and the National Environmental Policy Act (NEPA) require that a detailed analysis be made of environmental impacts resulting from major state and federal actions which significantly affect the quality of the human environment. In addition, the Montana Major Facility Siting Act (MFSA) requires a comprehensive examination of impacts resulting from the construction of specific types and sizes of energy facilities in Montana. This environmental impact statement represents the analysis of a proposed 115-kV transmission line in Lincoln County, Montana, required by these statutes, and was prepared jointly by the U.S. Forest Service (Kootenai National Forest) and the Montana Department of Natural Resources and Conservation (DNRC) in a voluntary cooperative effort to fulfill the requirements of NEPA, MEPA, and MFSA with a minimum of duplication of effort.

APPLICABLE STATUTES AND PERMITS REQUIRED

The Major Facility Siting Act is administered by the DNRC and the Board of Natural Resources and Conservation (herein called the Board). Under this law, a certificate of environmental compatibility and public need must be obtained prior to the construction and operation of specific types of facilities, including electric transmission facilities. The Act specifies that a certificate is required for electric transmission lines of a design capacity of more than 69 kV and constructed above ground for a distance greater than ten miles. The DNRC is responsible for preparation of draft and final impact statements and a recommendation to the Board regarding such proposed facilities. This document is the draft impact statement required. It contains no recommendations; these will be made in the final impact statement following analysis of public comment on this draft. In the case of transmission lines (such as the proposed line) under 30 miles in length, the DNRC's work and recommendations must be completed within one year following receipt of the application. The final decision as to whether a proposed facility should be certified rests with the Board, which, according to the Act, may not grant a certificate unless it determines need for the facility and "that the facility represents the minimum adverse environmental impact, considering the state of available technology and the nature and economics of the various alternatives" (Section 70-810, R.C.M., 1947). The Act also stipulates that no certificate may be granted until the duly authorized state air and water quality agencies certify that the proposed facility will not violate state and federal standards and implementation plans.

In addition to the requirements of the Major Facility Siting Act, transmission facilities must receive a special use permit where national forest

lands are involved. The authority for the U.S. Forest Service to permit the use of national forest lands as rights-of-way for electric transmission lines is contained in Title 5 of Public Law 94-579, the Federal Land Policy and Management Act of 1976 (90 STAT 2743) (see appendix B). Rules and regulations under this law are being formulated and are expected to be final within months. Issuance of permits for land use is currently being done under procedures in Forest Service Manual 2710 pending final rules and regulations under Public Law 94-579. All such permits are temporary and terminable. Permits will be terminated and rewritten under the new rules and regulations when they become available. The applicant must also comply with all applicable requirements of the Federal Energy Regulatory Commission under the Federal Power Act of 1935 (149 STAT 8471; 60 USC 791). Certification by local conservation districts as required by the Natural Streambed and Land Preservation Act may be necessary should line construction involve disturbance of the banks or beds of perennial streams.

HISTORY AND DESCRIPTION OF PROPOSED ACTION

On December 30, 1977, an application was filed with the DNRC and the USFS Regional Forester by Northern Lights, Inc., a member-owned rural electric cooperative based in Sandpoint, Idaho, for permission to construct approximately 27 km (17 mi) of 115-kV electric transmission line with a 24.9-kV underbuild from the Bonneville Power Administration (BPA) substation (located approximately 1.6 km [1 mi] east of Troy) to the proposed ASARCO, Inc., Mount Vernon Mine south of Troy (figure 1). A copy of the application is presented as appendix A. The purpose of the proposed line is to serve an anticipated peak load of approximately 14 megawatts (MW) with peaks to 18 MW involving the size reduction of mineral-bearing rock and physical concentration of minerals. The proposed mine and concentrator require a separate certificate under Montana's Hard Rock Mining Law of 1971, which is administered by the Montana Department of State Lands (DSL); these facilities are the subject of another environmental impact statement (USDA and Montana DSL 1978). At the time of this publication, ASARCO has not yet been granted the necessary permits for construction.

The proposed transmission line would be owned and operated by the applicant (Northern Lights, Inc.), although ASARCO would advance funds to the applicant for construction which would be credited against the purchase cost of the power used by them over a period of 20 years.

The applicant proposes to build the line using primarily 15-21 m (50-70 ft) single wooden pole tangent structures, with H-frame suspension 3-pole structures used where necessary. For most of its length, the proposed line would closely follow the right-of-way of the applicant's existing 12.47-kV electrical distribution line, which would be upgraded to 24.9 kV and installed on the same poles as the proposed 115-kV transmission facility. Thus, a single set of poles would accommodate both the existing distribution line and the proposed transmission line. The width of the cleared right-of-way for the proposed line would be 9-15 m (30-50 ft) in comparison to the 6 m (20 ft) width of the existing clearing. Where the proposed line does not follow the existing distribution line, it would closely parallel a proposed all-weather access road from the Mount Vernon Mine to Montana Highway 56. An alternative

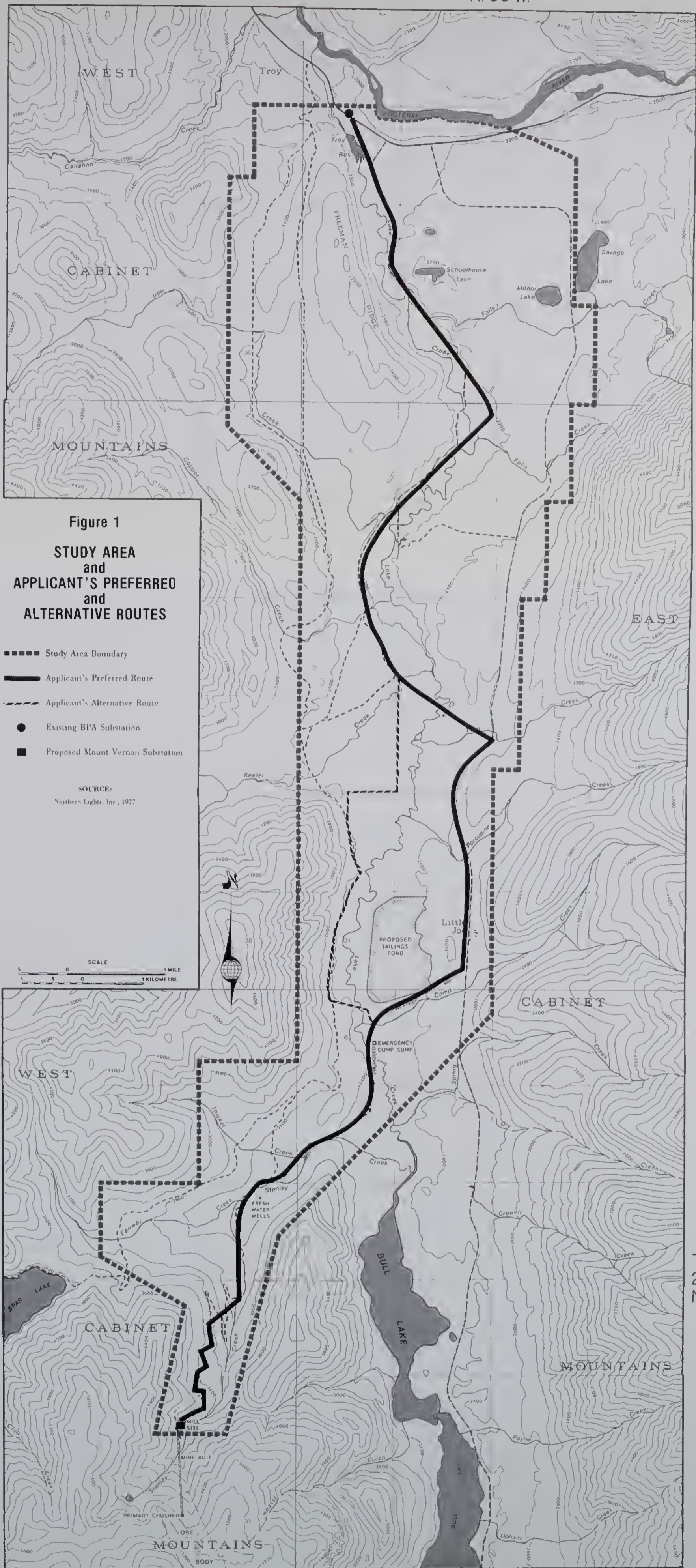
R. 34 W.

R. 33 W.

T. 31 N.

T. 30 N.

T. 29 N.



route proposed by the applicant leaves the existing right-of-way approximately 26 km (16 mi) south of the substation and proceeds along a gravel road to join the preferred route approximately 5 km (3 mi) to the south (figure 1).

The applicant maintains that the transmission facility as proposed is necessary to provide power for the proposed mine, and that on-site generation would not only create a more serious environmental impact but would not be economically feasible. Electricity produced by diesel generation would be more expensive, according to the applicant, than the electricity to be provided by the applicant via the proposed facility, and the applicant fears that the supply of diesel fuel could be disrupted through oil embargo. An additional alternative, a 115-kV transmission line from the Noxon area to the Mount Vernon Mine, was believed by the applicant to be infeasible because of the greater length of line and higher costs required. Similarly, a loop line to increase reliability was not considered feasible because it would more than double line costs.

Upgrading of the applicant's existing 12.47-kV distribution line is not required at this time, but, according to the applicant, the proposal would eliminate the inevitable need to upgrade the line at a later date.

DESCRIPTION OF THE PROPOSED LINE AND ITS CONSTRUCTION

The applicant's proposed routes and substation sites are shown in figure 1. The following data were supplied by the applicant; for more details, see appendix A.

The total length of the preferred route from the Troy Substation to the proposed Mount Vernon Mine is approximately 27 km (17 mi). This includes approximately 22 km (14 mi) with a 24.9-kV underbuild constructed along the route of an existing line and 5 km (3 mi) of new construction with an unspecified length of underbuild. The voltage level of the proposed transmission line is 115 kV and that of the underbuilt distribution line, 24.9 kV.

The total right-of-way width would be 9 m (30 ft) where horizontal post structures are to be used, and 15 m (50 ft) where H-frame structures are to be used.

The proposed poles would be single-wooden-pole tangent structures with fiberglass horizontal line posts for the 24.9-kV underbuild (see appendix A, exhibit 3). Also proposed are H-frame suspension structures with wood cross-arms for medium and large angles (see appendix A, exhibit 6). The number of poles along the existing line would be approximately 9/km (15/mi), and along new road without underbuild, 7.5/km (12/mi).

There is no lightning protection system proposed.

The projected construction costs are: \$67,069 per mile along the existing line (17 km or 10 mi); \$62,382 per mile to the water wells (6 km or 4 mi); and \$46,364 per mile from the wells to the Mount Vernon Mine Substation (5 km or 3 mi).

The substation at the north end of the line is the existing Troy Substation (figure 1), owned by BPA. A new switching structure is proposed there. At the south end of the proposed line, a new Mount Vernon Mine Substation (figure 1) is proposed. This new substation would be built by ASARCO on U.S. Forest Service land. The substation would contain two 12/15 MVA, 115-to-4.16-kV transformers.

The applicant's proposed construction analysis is given in its application, which is included as appendix A of this impact statement.

PREVIOUS WORK

At the request of the Montana Department of State Lands (DSL), the DNRC prepared under contract a preliminary analysis of the environmental impact of the applicant's preferred route which appeared in the ASARCO Mount Vernon Mine project EIS (USDA and Montana DSL 1978). That analysis did not involve selection or evaluation of alternative routes; it pertained only to a single route, that proposed by the applicant. Nor did it contain the analyses of need, alternatives, and construction and design criteria which are a part of this document.

OVERVIEW OF THE STUDY AREA

The study area is in western Lincoln County, Montana, near the Montana-Idaho border. It generally follows the Lake Creek Valley between the East and West Cabinet Mountains and is bordered on the north by the Kootenai River and on the south by Mount Vernon. Elevations range from 570 m (1880 ft) along the Kootenai River to over 1200 m (4000 ft) along Stanley Creek at the extreme southern end of the study area. Bull Lake, one of the largest natural lakes in northwestern Montana, lies near the southeastern edge of the study area; Spar Lake, smaller and nearly 300 m (1000 ft) higher, lies near the southwestern edge.

The study area is located within the Northern Rocky Mountain physiographic province and is drained by the Kootenai River and its tributaries. Lake Creek, which forms the axis of the study area over most of its length, flows through a relatively wide, flat valley which has been scoured by glacial action and is underlain primarily by glacial gravels and alluvium. Troy Reservoir, a small impoundment of Lake Creek, is approximately 2.4 km (1.5 mi) southeast of Troy. Several small glacial lakes found near the lower (northern) end of the valley include Mud, Schoolhouse, Milnor, and Savage lakes; all are smaller than 40 ha (100 acres) in size. The mountains bordering the Lake Creek Valley rise abruptly and steeply from the valley floor. Numerous small, high-gradient tributary streams arise in these mountains, cut steep, roughly parallel valleys, and eventually enter Lake Creek. Iron Creek, which flows southeast to enter Lake Creek 8 km (5 mi) south of Troy, flows through a flat valley about 1 km (0.7 mi) wide which extends from Troy to the junction of Iron and Lake creeks. This valley is separated from the much larger Lake Creek Valley by Freeman Ridge, a low (maximum elevation 875 m or 2870 ft) but steep-sided uplifted area. Keeler Creek, largest of the tributaries of Lake Creek, arises in the mountains to the east and enters Lake Creek near the

center of the study area. The southern portion of the study area includes Stanley Creek and its tributary Fairway Creek, which arise in the mountains surrounding Spar Lake and flow through steep, narrow valleys to enter Lake Creek at the outlet of Bull Lake.

The climate of the study area is under a maritime or oceanic influence modified by orographic effects and is characterized by relatively high rainfall and mild temperatures. Average annual precipitation ranges from 76 cm (30 in) near Troy to over 127 cm (50 in) near upper Stanley Creek. Precipitation is fairly evenly distributed throughout the year, although a dry season often occurs in July and August. Winds are primarily from the west.

The study area supports plant and animal communities typical of the warm, moist, forested mountains and intermontane valleys of northern Idaho and extreme northwestern Montana. Most of the study area is or has until recently been forested; these forests show a strong similarity to those of the coastal mountain ranges of Washington and Oregon. Forest habitat types fall within the Douglas fir series in the drier portions of the study area (lower Lake Creek Valley and exposed ridges) and within the grand fir, western red cedar, and western hemlock series in moister sites. These lush, moist forests, among Montana's most highly productive, support diverse bird and mammal communities, including most of the species found in northwestern Montana. Species of local importance are forest grouse (ruffed, blue, and spruce), big game (mule deer, white-tailed deer, elk, moose, mountain goat, black bear, and mountain lion), raptors, waterfowl, and many nongame species. The endangered bald eagle and peregrine falcon have been reported from the area; the threatened grizzly bear inhabits the mountains to the southwest of Bull Lake but is not believed to occur regularly in the study area. The study area provides an excellent sport fishery, dominated in Lake Creek by rainbow and brook trout; the smaller, swifter, and colder tributary streams support primarily brook trout.

The land-use pattern which has developed in the study area is strongly influenced by the dense, productive forest cover. Over 85 percent of the study area is forested, and timber production and harvest and forest recreation are the prevalent land uses. Cleared pastures, hayfields, and a few small patches of cropland are scattered throughout the Lake Creek Valley. Troy and the small village of Little Joe are the primary human settlement areas, although summer homes and rural subdivisions have spread throughout the Lake Creek Valley, primarily along lakes. The Cabinet Mountains Wilderness lies to the east of the study area.

The area has developed an economy based on forest products, mining, and (to a lesser extent) tourism and services. The study area is entirely rural, although changes in land use and increases in rural residences have accelerated throughout the area, especially in the vicinity of Troy and Savage Lake.

A BPA-Pacific Power and Light 115-kV transmission line parallels Highway 2 through the northern edge of the study area. A number of smaller distribution lines and telephone lines traverse the Kootenai River, Lake Creek, and Iron Creek valleys. Among these is the applicant's 12.47-kV distribution line planned to be replaced with the proposed facility. This line proceeds from the Troy Substation (along Highway 2, 3 km {2 mi} SE of Troy) southward

along the Lake Creek Road to Keeler Creek, where it crosses Lake Creek and follows Highway 56 southward.

CHAPTER TWO

APPROACH

When an application for construction of a transmission line is received by the DNRC, several phases of the study must begin. The need for electrical power is examined, system alternatives to serve such need are studied (the applicant's requested transmission line is one alternative, but the DNRC studied others as well--see chapter 3), a study area is chosen, and work on identification of alternative routes within the study area begins. Based upon its findings, the DNRC recommends to the Board that alternative which seems most practical, economical, and harmonious with the natural and cultural environments. In this context, environmental impact is taken in a broad sense to mean the effects, both beneficial and adverse, on the social, economic, and natural environments. Many environmental impacts cannot be predicted with certainty; rather, they can be predicted as having some likelihood of occurrence. This likelihood is referred to here as environmental impact risk.

DNRC staff are assigned to conduct corridor selection studies related to identified environmental and sociological concerns, which may vary from study to study according to their relevance to individual applications. Seven concerns, described below, were identified for this study. Maps evaluating the study area in terms of each appropriate concern were prepared. One exception is the socioeconomic concern, as such conditions are not easily mapped.

Section 70-816 of the Major Facility Siting Act lists a large number of environmental concerns which must be considered in the evaluation of each application, including the present one. While all were considered, not all are relevant to the identification and comparison of alternative routes. Appendix C lists all concerns covered in the Act and explains which are not relevant. Those which are relevant to the siting of this project were grouped into seven more general environmental categories (herein called "concerns") which together account for all significant environmental impacts of this project. These seven concerns are:

- 1) Vegetation (land productivity)
- 2) Socioeconomic attributes (including the presence and sensitivity of archaeological and historic sites)
- 3) Aquatic Systems (including erosion hazard, water quality, and aquatic life)
- 4) Land Use

- 5) Visual Quality
- 6) Wildlife
- 7) Substrate Suitability

The probable effects of the proposed line on each of these concerns were taken into account in selecting and evaluating alternative routes.

A list of factors which together determine the cost of a line follows:

- 1) Length of line
- 2) Cost of easements and land
- 3) Landowners' resistance
- 4) Special engineering problems such as road building, angles
- 5) Number of transformers or amount of substation construction needed

For the present application, these factors, taken together and applied to each alternative route considered, result in no major differences in line cost among the routes.

In most previous transmission line studies conducted by the DNRC, the approach to route selection has been as follows: (1) a study area large enough to contain all feasible routes is selected; (2) general resource data are gathered uniformly over this study area and mapped; (3) these resource maps are used to identify a number of alternative 3-km (2-mi) wide corridors which are most suitable for line siting; (4) one of these corridors is recommended by DNRC as the preferred corridor; (5) one of the corridors is approved by the Board; (6) a centerline (or "route") is identified by the applicant within the approved corridor; (7) additional, more detailed resource data (including landowner concerns) within the approved corridor are gathered by the DNRC; (8) these data are used to suggest changes or modifications in the centerline location; and (9) the final centerline is approved by the Board. Construction can then begin.

The proposed facility, however, is a special case. The location of the load source (the proposed Mount Vernon Mine) is fixed, and only three feasible existing sources of power--the Troy Substation to the north and the Noxon and Cabinet Gorge substations to the south--exist. The latter two were ruled out based on increased line length, construction costs, and environmental impacts (see chapter 3), leaving only the Troy-Mount Vernon Mine alternative. The relatively short length of the line and the steepness of the mountains bordering the Lake Creek Valley limit reasonable options for line placement to a single corridor which varies in width from roughly 6 km (4 mi) at its widest point to 1 km (0.5 mi) where confined by topography along Stanley Creek. Identification and comparison of alternative 3-km (2-mi) wide corridors in this case would be meaningless. It is thus possible--and appropriate--to omit in this EIS some of the steps listed above and identify and compare alternative routes or centerlines rather than alternative corridors.

The study area for this project, shown in figure 1, is believed to contain all feasible routes by which a 115-kV line could connect the Troy Substation with the Mount Vernon Mine. By thus confining the study area, it is possible to give it detailed study of a level normally deferred until centerline evaluation. This approach is preferable, in the opinion of the DNRC, to diluting study effort over a larger area which would contain possible but infeasible routes.

Alternative routes within this study area were identified by the applicant and by the DNRC staff based on field inspection and on the information presented or referred to in this report. These routes, or centerlines, are presented with the understanding that detailed engineering analysis of the route ultimately selected may require minor deviations (<50 m) from the routes as mapped here.

Ideally, a single route should be identified which best fulfills the objectives and concerns associated with the line. For example, if the sole objective were to keep the line as short as possible, a straight line between the terminals is the only route which would fulfill this objective. A transmission line, though, involves many more concerns than its length. The cost of the line is an important consideration; however, the least expensive line through a given area is not necessarily either the shortest or the one most compatible with other interests, such as visual impact or land use.

Although in theory there is only one optimum route, it may in practice be difficult to distinguish among a small number of potential routes. Not all persons evaluate the identified concerns in the same way. For example, a hunter may favor a route that avoids the range of his favorite game animal, while a hiker may favor a route which interferes the least with his favorite hiking trails. Also, every fact potentially relevant to the siting of the line in the study area cannot be known. Thus, the costs and impacts of potential routes can be estimated only from existing knowledge; actual costs and impacts may vary from these estimates. Many compromises and sometimes conflicting interests enter into route selection.

CHAPTER THREE

NEEDS AND SYSTEMS ALTERNATIVES

EXISTING ELECTRICAL SYSTEM AND UTILITY CORRIDORS

Electrical loads in Lincoln County are served by four agencies; Northern Lights, Inc. (the applicant), Lincoln Electric Coop, Montana Light and Power Co. (MLP), and Pacific Power and Light (PPL). The first two are member-owned, purchase their power from BPA, and generally serve the rural areas of the county. The applicant, Northern Lights, Inc., is based in Sandpoint, Idaho, and serves loads in eastern Washington, northern Idaho, and northwestern Montana. Lincoln Electric Coop is based in Eureka, Montana, and serves rural areas in Lincoln County. MLP, a subsidiary of the St. Regis Paper Company, gets power from its hydroelectric facility on Lake Creek and from a wood-waste fired thermal generating unit at the Libby plant of St. Regis. In addition to supplying the needs of the Libby plant, MLP serves the city of Troy and surroundings. PPL is an investor-owned utility with considerable generation capacity of its own and with service areas in southwestern Oregon and northern California, as well as several smaller, discrete areas in central and northern Oregon, central Washington, northern Idaho, and around Kalispell and Libby, Montana.

Existing power lines within the study area are shown in figure 2. Loads within the study area are generally supplied by the applicant, although some areas near Troy in the northwest part of the area are served by MLP. A 34.5-kV MLP line originates at the Lake Creek hydro facility and proceeds eastward to Libby. A 115-kV PPL line leads from Sandpoint, Idaho, to BPA's Troy Substation, then proceeds eastward to Libby, closely paralleling the MLP 34.5-kV line. The applicant purchases power from BPA at the Troy Substation at 12.47 kV, paying a transformation charge to BPA. This power is distributed throughout its service area in the Lake Creek and Bull River valleys by a network of distribution lines which take off from the existing line proposed for upgrading to 24.9 kV. This line continues south, more or less parallel to the highway, to eventually tie in with both the Cabinet Gorge and Noxon Rapids substations. However, a switch south of Bull Lake is kept open under normal operating conditions.

The west side of the study area is served by the MLP, with distribution lines near Iron Creek Road and the area west of Freeman Ridge. There are also a number of above-ground telephone lines in the study area.

NEED

The need for additional power or modifications to the existing trans-

mission system in an area can be established by satisfying at least one of the following three criteria:

- 1) Capacity. Increased present or projected electrical load in one or more areas to the extent that existing transmission lines cannot deliver sufficient power, which would result in an unacceptable voltage drop in part of the system.
- 2) Reliability. Electrical service in some areas having excessive dependence upon a small portion of the transmission system, such as a single line or substation, which would result in low reliability. If one part of the existing system were to fail, the remainder of the system would be unable to serve the load.
- 3) Transient Stability, that is, the ability of generation facilities to produce synchronous 60-cycle electricity, which may be affected by line outage or inappropriate line capacity. This criterion is not applicable to the present application.

The need for the proposed ASARCO Mount Vernon Mine could not legally be considered by DNRC as an aspect of need for the proposed transmission line since (1) statutory authority for that consideration is not given DNRC by the Major Facility Siting Act and (2) the right to mine is granted ASARCO by the Mining Law of 1872, provided state and federal regulations are met. Thus, the need for copper and the potential profitability of ASARCO's mining venture were aspects of need not considered in this report.

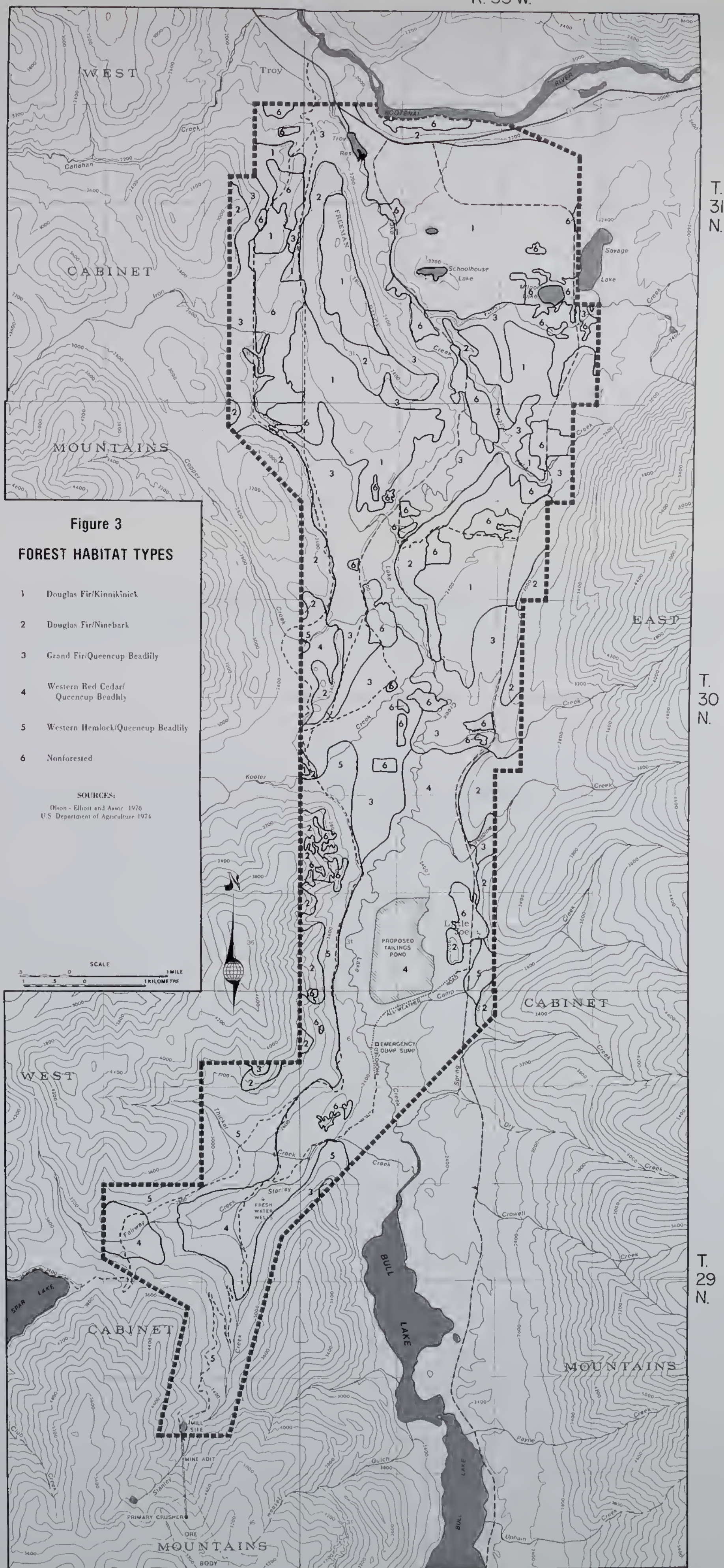
Capacity

The load proposed to be served by this line is a proposed copper-silver mine, ore crusher, and associated facilities to be built by ASARCO in the vicinity of Mount Vernon and the Lake Creek Valley. The projected load is 14 MW, with possible peaks to 18 MW. The applicant proposes to serve this load with a 115-kV line from the Troy Substation to the plant site.

Need for the Construction of the Line Now. The need for the proposed line is related to the conditional nature of the load. If the mine and associated facilities open as proposed, there will be a demand for electricity; if they do not open, there will be no demand. Even if the facilities do open, conditions in the metals market would affect their profitability and, therefore, the likelihood of their continued operation. Given these potential uncertainties in the timing and the continuity of the load to be served, the construction of a line such as this would be risky in the absence of some guarantees to the utility. In this case, the applicant proposes to deal with the risk by not starting construction until ASARCO is sufficiently sure of its plans to be willing to advance funds for construction of the line. The applicant would then give ASARCO an annual credit against its electrical bill until the construction advance was repaid, without interest (Nordeen 1978). The implications of this arrangement are discussed in chapter 4 under "Socioeconomic Attributes."

Need for Construction of the Line at the Proposed Voltage. A second

R. 33 W.





consideration has to do with the size of the proposed line. The thermal carrying capacity of the proposed 115-kV line is around 60 kVA, which is three to four times the load it is supposed to carry. Thus the load could be served at a lower voltage, with a consequent reduction in the cost of construction of the line. Since the delivery voltage at Troy is 115 kV, construction of a lower voltage line would necessitate the installation of a transformer at Troy, which would offset the savings in line construction costs. When the BPA/PPL line is upgraded to 230 kV, it will be necessary to install a transformer; analysis is complicated by the uncertain scheduling of that upgrading.

Need for Rebuilding the Distribution Line. Normally, electric transmission lines under 69 kV do not come under the Major Facility Siting Act and hence are not proper subjects for scrutiny by DNRC's Energy Division. Since in this case the opportunity to combine a needed reconstruction and upgrading of an existing distribution line is given as a major side benefit of the construction of the proposed 115-kV line, and since the alternate routes considered by the DNRC do not generally permit that reconstruction, it is essential that the need for reconstruction be considered.

There are two aspects to the question of need for reconstruction: the need for increased capacity and the physical conditions of the structures and conductors. According to the applicant's engineering consultants, the existing load on the 12.47-kV line is 500 kW; this, it is estimated, will grow to around 1 MW in 10 years' time. DNRC calculates that the capacity of the existing line is over 3 MW, and the capacity of the proposed underbuild of 24.9 kV, given the proposed conductor size, would be in excess of 13 MW. The application for the proposed line indicates that, with expected annual load growth at 6.5 percent, the reconstructed line would serve anticipated loads for 44 years, indicating a capacity on the order of 8 MW, around 16 times greater than the existing load. Since the 3-MW capacity of the existing line will not be reached for 25-30 years, insufficient capacity is not a valid justification for reconstruction.

The existing line was constructed around 20-25 years ago of butt-treated poles. Some of these poles have already shown sufficient signs of rot to warrant replacement, and one pole apparently gave way unexpectedly, causing an outage 3½ hours in duration. Normal procedure would be to replace the poles on an individual basis as necessary, making it unlikely that the line would ever be rebuilt. The savings associated with underbuilding the distribution line on 115-kV poles consists of the maintenance and pole replacement costs that would accrue over the expected trouble-free life of the new structures, offset by the incremental cost of underbuilding. A rough estimate of this incremental cost can be made from cost figures presented in the application. One mile of line with an underbuild with no angles would cost \$51,816. One mile of new line with no underbuild, requiring 12 poles instead of 15 and less hardware, would cost \$39,602. If one estimates the cost of building the line along the proposed route with no underbuild except from the plant site back to the tailing pond, the cost turns out to be \$850,000, compared with \$1,068,000 for the proposed method. Thus the incremental cost of reconstructing the existing distribution line is on the order of \$218,000. If the present value of the expected maintenance and pole replacement costs on the existing line were at least that high, the underbuild reconstruction would be justified on investment grounds alone; at this time, maintenance and pole replacement costs are unknown.

Additional benefits accrue from the decreased probability of failure-

related outages and from the scheduled nature of the construction rather than relatively unscheduled pole replacement. In addition, the date at which the line runs into capacity problems and must be upgraded or reinforced is postponed; instead of requiring work in 25 or 30 years, the larger line at 24.9 kV would suffice for an estimated 44 years. However, the value of this postponement is greatly reduced when discounted to the present. With a 10 percent discount rate, a cost of one dollar postponed for 14 years is reduced to 29 cents, for a present-value saving of 71 cents; since that saving occurs around 25 years in the future, its present value is only 7 cents. Thus, if the cost of upgrading the existing line is \$200,000, the present value of postponing this cost from year 25 to year 44 is around \$13,000.

In summary, this analysis of the need for rebuilding the distribution line is inconclusive because cost figures to assess the overall ratio of costs and benefits of underbuilding are unavailable. The benefits of underbuilding are the sum of the present value of pole replacement and maintenance costs on the existing distribution line, the present value of the saving obtained by postponing the time when the line would need to be upgraded next, and the present value of the savings from outages averted by having newer poles and a wider cleared right of way. The costs of underbuilding are estimated at \$218,000. If values can be placed on the three types of benefits, then it can be determined whether underbuilding is economically attractive.

Reliability

Reliability is an important aspect of the electrical service received by consumers. Utility customers are accustomed to a given level of reliability and have adjusted their use patterns to it. More reliability is a desirable attribute in utility planning that can generally be achieved only at a high cost. From a systems perspective, the optimal level of reliability is the one which gives the greatest net benefit over costs. The benefits of reliability are the losses avoided by not having outages and are a function of the length and timing of outages and the types of loads being served. They range, for residential customers, from mild inconvenience to ruined food in freezers, burst pipes, and significant capital losses. For businesses they may range from lost output to capital losses, depending on the type of business, the type of equipment used, and the degree of backup reliability provided by the business itself.

Reliability is provided by over-engineering facilities and by providing excess capacity and duplicate capacity at all levels of the utility system, including the customer level. Utility practice in determining a proper level of reliability appears to be based on rules of thumb rather than on analysis, although cost considerations temper the decision. These practices vary from one utility to the next and are not given uniform application even within each utility. An example of a standard rule of thumb is that the transmission network serving an area must have sufficient redundancy that, in the worst case single outage, voltage levels do not go down by more than a specified amount (for example, 5 percent). This would mean, if the rule were given uniform application, that all loads must be served by at least two sources. Application of this rule to the Mount Vernon Mine load would necessitate either two lines running down the Lake Creek Valley to the mine or construction of a line from Noxon or Cabinet Gorge in addition to the one proposed by the applicant. It would appear that, in the current case, the costs of providing such

redundant capability is not justified by the costs of the expected outage time on the proposed line. Without redundant capacity, an outage will mean that mine and plant operations will be shut down temporarily. Similarly, no lightning protection is provided for in the proposed design of the line. Since the area in which the line is proposed to be built has low lightning risk, the expected need for and benefits of such protection would be small and would not appear to warrant the extra cost.

The existing distribution line does not have loop (or duplicate facility) characteristics, so an outage on the proposed line would generally cause a loss of service to consumers. There were 15 outages on the distribution line between January 1973 and November 1977 (see appendix A, page 85).

It may be possible to close the circuit breaker south of Bull Lake, which is normally kept open, to serve the area from the south in the event of an outage at the northern end of the study area. Maintaining this possibility after reconstruction would require a step-up transformer from 12.47 to 24.9 kV at the point of takeoff of new construction.

With regard to reliability of service at 115 kV to the mine and concentrator facilities, no backup service is proposed. Any outage on the 115-kV line between the Troy Substation and the substation at the mine would interrupt service and cause a shutdown of all facilities served from the southern substation. This would cause a shutdown of the concentrator; since production is planned round the clock, the time could not be made up. If the outage occurred north of the takeoff point, some low-voltage customers would be affected as well. If the facilities at the tailings pond and those at the dump sump site are served from the low-voltage distribution line rather than from the concentrator, they would be unaffected by any outage on the slopes of Mount Vernon.

SYSTEM ALTERNATIVES

The alternative chosen to meet an electrical system's needs for additional power must best serve the welfare of the citizens of Montana. This is expressed in the Montana Major Facility Siting Act (Section 70-802, R.C.M. 1947):

It is the constitutionally declared policy of this state to maintain and improve a clean and healthful environment for present and future generations; to protect the environmental life support system from degradation and prevent unreasonable depletion and degradation of natural resources.

Construction of a new transmission line may not always be the best overall alternative, even if most desirable from an engineering standpoint. The optimum alternative is one which solves the electrical needs of the system while striking a balance between greatest reliability, least cost, and least impact on the cultural and natural environments. The large number of possible alternatives can be grouped into these categories:

- 1) Upgrade or Expand Existing Systems. In some situations, an existing transmission line can be upgraded to a higher voltage, new conductors can be installed, or compensating equipment can be installed to increase the capacity of the line. Because no transmission lines

exist in the vicinity of the proposed Mount Vernon Mine, this alternative is not possible.

- 2) Peak Load Management. The peak loads served by a transmission system are considerably higher than average loads. The system must have the capacity to serve the peaks. If peak loads can be reduced by changing the timing on some of the loads (such as domestic water heating or some industrial functions), deficiencies in the existing system can be eliminated without additional transmission lines. This is not considered a viable alternative to the present situation because no transmission line now leads to the proposed Mount Vernon Mine.
- 3) On-site Generation. Generation may be installed close to the loads. Generally, small generation units are expensive to operate, but the beneficial effects of having generation dispersed throughout the system should be offset against the additional costs of the generation itself. On-site generation at the proposed mine is discussed more fully on page 27
- 4) System Alternatives. A transmission system includes many lines and substations which work as a unit to deliver power. Many system deficiencies can be solved by more than one arrangement of lines. A problem may be solved by connecting two substations with a transmission line; however, another arrangement of transmission lines and substations may be a more satisfactory solution.
- 5) Employment of Different Transmission Technology. Electrical power can be transmitted by conventional A.C. transmission lines, by D.C. lines, or by underground conductors.
- 6) Transmission Voltages and Line Design. Before construction of a conventional transmission line between two points in the system, decisions must be made concerning the voltage level, the size of the conductors, and the design and materials to be used in the support structures. A double-circuit 230-kV line built on steel towers differs in many ways from a 69- or 115-kV line built on single wooden poles. The impacts are different in kind, as well as degree, and one line could not substitute for another.
- 7) Alternative Routes. After a need in the transmission system has been determined, and the alternative of a transmission line connecting two points of the system has been chosen, the task remains of selecting the optimum route. An infinite number of routes can connect two points; the straightest and shortest may not be the best.

The goal of the present proposal--to provide power to the mine and concentrator--could be achieved in a variety of ways. Alternatives include on-site generation of power, electrical service from a source other than the Troy Substation, the development of a small hydroelectric facility on Stanley Creek, and service from the Troy Substation by a route other than the one proposed. In accordance with the intent of the Major Facility Siting Act, the DNRC attempted to evaluate the relative merits of these alternatives. Alternatives to the proposal not considered include the possibility of an alternative location for the

concentrator and the exploitation of other ore bodies instead of the Mount Vernon deposit, and alternative mining plans for the Mount Vernon ore body with different electrical requirements. Another alternative not considered was that the Board might take no action on the application. Under the Major Facility Siting Act, the Board must approve, conditionally approve, or deny the application; taking no action at all is not a choice open to the Board. If the applicant were denied a certificate by the Board, the applicant could still serve the proposed mine from the Troy Substation at increased cost with a lower-voltage line not under the purview of the Act. Should the applicant decline to do so, and should ASARCO continue in its attempt to mine at Mount Vernon, another source of power would have to be found, perhaps one of those discussed in more detail below.

Local Generation Alternatives

On-site Diesel Generation. DNRC evaluated the relative costs to the applicant of construction and maintenance of an on-site diesel generator in comparison with delivery of power from the Troy Substation to the mine via the proposed power line. The assumption was made (based on Montana Energy Advisory Council 1977) that the cost of electricity from BPA would go up 60 percent in 1979, 20 percent in 1981, and thereafter rise at the rate of 2 percent per year. Two alternative assumptions were made about the rate of increase in the price of oil: (1) that it would rise at the rate of 6 percent per year and (2) that the price would remain constant. Assuming that the rate of depreciation is 5 percent, that the cost of borrowed money is 6.2 percent, that taxes amount to 1.17 percent and insurance 1.21 percent, and assuming the costs for diesel generation shown in table 2, the cost in 1978 is 52 mills/kWh for on-site generation and 5 mills/kWh for delivered BPA power. By 1998 the costs are 52 mills/kWh for on-site generation assuming no rise in the price of oil (or 150 mills/kWh for on-site generation assuming a 6 percent rate of increase in the price of oil) and 11 mills/kWh for delivered power purchased from BPA at the rates discussed above. Even if the applicant had to pay the full incremental cost of thermal power (around 30 mills/kWh), there would be a cost advantage to construction of the line. More recent projections, showing a likely price increase by BPA of 80-100 percent in 1979, do not change this result.

TABLE 2
ITEMIZED 1978 COSTS FOR DIESEL GENERATION

Packaged 25-MW unit	\$ 3,036,000
Step-down transformer	160,000
Civil-structural	78,936
Oil storage, foundation, piping to units	126,723
Contingency Allowance	283,707
Operation & maintenance cost	1.8 mills/kWh
1978 oil price	\$3.57/million btu

Stanley Creek Hydropower. Also considered was the possibility of construction of a hydroelectric facility on Stanley Creek. According to preliminary estimates made by an independent promoter (Delp 1976), minimum flows on Stanley Creek are sufficient to generate 5000 hp, or approximately 3.73 MW. This is insufficient to operate the loads of the proposed mine and concentrator. The

mining plan of ASARCO could be scaled down to the point that the energy from Stanley Creek would be sufficient, which would also prolong the economic life of the mine. According to a recent U.S. Bureau of Mines report (USDA and Montana DSL 1978, appendix T), the discounted cash flow rate of return of the proposed Mount Vernon Mine would be reduced to unacceptably low levels by prolonging the life of the mine to 19 years or longer. Because this proposal lies beyond the scope of the Major Facility Siting Act, the Board has no authority to order a change in the mining plan. This alternative was not considered further.

Transmission Alternatives

Another alternative considered was the possibility of service from a source other than the Troy Substation. In particular, service from the substation at either Noxon or Cabinet Gorge was considered. Service from Noxon would require the construction of a transmission line 1.9 times as long as the required length of construction on the proposed route, and from Cabinet Gorge, 2.2 times as long. Environmental impacts resulting from construction along these routes would be worse than those associated with the preferred route. This alternative was not pursued further.

CHAPTER FOUR

ENVIRONMENTAL CONCERNS AND IMPACTS

As discussed in chapter two, seven major environmental concerns were identified for this project:

- 1) Vegetation
- 2) Socioeconomic attributes
- 3) Aquatic systems
- 4) Land use
- 5) Visual quality
- 6) Wildlife
- 7) Substrate suitability

This chapter contains specific data on these concerns within the study area. Each section below presents an inventory of the study area with respect to each concern, a discussion of potential impacts of the proposed transmission line, and (in most cases) mitigating measures to help offset detrimental effects of any of the line's construction phases.

VEGETATION

Inventory

Plants, as a source of food and fiber and the basic component of wildlife habitat, are an important renewable resource in the study area. In addition to their importance as a raw material, they are essential to visual quality, nutrient cycling, oxygen production, and total ecosystem function. However, methods of comparatively evaluating vegetation in respects other than production and economic use are relatively few, owing to the complexity of ecosystems and the difficulty of obtaining and assimilating data for a large area. Comparative productivity is one valid way of taking plants and site into account for impact evaluation.

The fundamental resource involved in productivity is site quality, the sum of all factors affecting the site's capacity to produce vegetation. In this section, productivity is treated from a utilitarian standpoint, rather than in terms of plant species diversity or total biomass.

Vegetation is of concern here in two major respects: (1) the amount of standing timber and brush that must be removed along the right-of-way in order to accommodate the proposed line and construction machinery, and (2) the amount and relative productivity of forest land which is taken out of production by maintenance of a cleared right-of-way. Thus, the primary concern involves forested land, which predominates in the study area. Cropland vegetation is discussed in "Land Use" on pages 46 through 53 .

Forested land in the study area was inventoried using the Forest Habitat Types of Montana classification (Pfister et al. 1977). A habitat type is a unit of land capable of supporting a certain climax plant association, for which the type is named. Habitat types consider floristics, dominance, layered structure, soil factors, microclimate, and succession and may be used to predict potential productivity. Habitat types of the study area were mapped at a scale of 1:24,000 and are shown as figure 3 and described in table 3.

In addition to habitat types, which reflect the biotic potential of land for timber production, consideration was also given to existing stand density and to the location of recent clearcuts and other forest clearings. Siting the route within these areas would reduce the amount of new timber clearing necessary for line construction (see "Land Use" on pages 46 through 53).

Impacts and Mitigating Measures

The proposed line's impacts on commercial timber productivity would stem from the need to maintain a cleared right-of-way. The applicant's design specifications call for a 9 m (30 ft) cleared right-of-way where single-pole structures are used and a 15 m (50 ft) cleared right-of-way where H-frame structures are used. However, taller trees and snags may be removed beyond this distance to reduce the risk of line outage due to falling trees. Also, access roads may require additional clearing and additional loss to the productive base.

The area cleared for a transmission line is lost to commercial productivity because timber is not allowed to become economically mature, although posts or Christmas trees may be harvested in the right-of-way. Logging slash, if not disposed of, can become a fire hazard, a source of potential insect outbreak, and an impediment to travel; if burned, it contributes to air pollution.

Although largely lost to commercial production for the life of the transmission line, the right-of-way may retain other beneficial uses. Mitigating measures that preserve site quality and meliorate visual impact are listed below; they must be tempered by the practical considerations of line maintenance, the economic advantages of mechanical treatment, and the need for slash disposal to reduce the hazards of fire and of tree-damaging insect epidemics.

Clearing. With the exception of seedlings, conifers within the right-of-way should be removed and the commercial portions utilized. The removal of conifer seedlings would require scarring the land, contributing to site deterioration; because a new generation of conifers would be invited, little would be gained. Some shrub and herb species, if little disturbed, will prosper in the absence of an overstory and tend to inhibit conifer reproduction while maintaining soil stability.

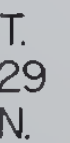




TABLE 3

DESCRIPTIONS OF HABITAT TYPES WITHIN THE STUDY AREA

Habitat Type	Location/Physiography	Predominant Tree Species	Characteristic Understory Species	Yield Capability Range	Remarks
Douglas fir/ kinnikinnick	Restricted to northern half of the study area primarily in relatively flat lower valleys of Lake Creek and Iron Creek and the east slope of Freeman Ridge.	ponderosa pine, Douglas fir	kinnikinnick, horizontal juniper	low to moderate	The driest and least productive of the habitat types in the study area. The basal area of trees is relatively low.
Douglas fir/ ninebark	Found primarily along the Kootenai River on cool, moist sites and on steep slopes at the edge of Lake Creek Valley.	Douglas fir, western larch, lodgepole pine	ninebark, creambush, ocean-spray, snowberry, spiraea	low to moderate	Although this habitat type is widespread in western Montana, it is of limited occurrence in the study area.
Grand fir/ queencup beadlily	Occupies portions of Lake Creek Valley and some foothill drainages having intermediate moisture. Of limited occurrence in study area.	grand fir, Douglas fir, western larch, lodgepole pine	snowberry, twinflower, queencup beadlily, sweetscented bedstraw	high to very high	Steep, dry exposures may be well below average productivity.
Western red cedar/ queencup beadlily	A moist, lush habitat type predominating in the southern portion of the study area within Lake Creek Valley.	western red cedar, Douglas fir, subalpine fir, grand fir, Engelmann spruce, western larch	thimbleberry, dwarf huckleberry, twinflower	high to very high	
Western hemlock/ queencup beadlily	Found along the Stanley Creek drainage in the extreme southern portion of the study area and along the lower foothills bordering the upper Lake Creek Valley.	western hemlock, western red cedar, subalpine fir	twinflower, myrtle pachistima, yew, queencup beadlily, dwarf huckleberry	high to very high	Well suited for intensive silviculture. As other habitat types having queencup beadlily as an understory component, tree growth rates and recovery rates after harvest are relatively high.

SOURCE: Pfister et al. 1977

A typical vegetation treatment in forests is to remove all trees within eight to ten feet (slope corrected) of the centerline. Beyond this area, those trees which threaten the line are also removed. Determination of whether a tree is "threatening" is based upon tree height and distance to the line, whether the tree leans toward the line, and the apparent health and vigor of the tree. As a result of cutting such trees, remaining trees tend to lean toward the line. When these trees become hazardous to the line, they are cut. Increasing restrictions on right-of-way clearing often make it necessary to treat rights-of-way annually for a few consecutive years after construction of a line.

In making suggestions for minimizing initial right-of-way clearing, one assumes that subsequent maintenance would be frequent, that roads would be kept open, and that slash disposal would be no problem. Loss of site quality would be minimized by a thorough initial treatment, followed by revegetation of scarified areas and no further treatment of the area until line safety is again compromised. Such a treatment may include removal and use of trees beyond the right-of-way that threatened the line or may in 20 years threaten the line. Trees selected for cutting could be chosen according to present height, distance from centerline, sag of conductors, and projected growth. Under optimum conditions, trees in the study area could grow 21 m (70 ft) or more in 50 years, depending on habitat (Pfister et al. 1977).

Slash Disposal. If economically attractive, slash could be chipped for pulp and particle board use. The public could be encouraged to collect firewood from logged areas, further reducing slash.

If enough slash remains to require burning, concentration of slash (e.g., dozer piling) is preferable to broadcast disposal because it minimizes exposure of mineral earth and damage to understory species. Burning areas and timing of burns can be chosen to minimize visual impact and impacts on air quality.

Access Roads. Open roads invite irresponsible vehicular use, resulting in damage to vegetation and site deterioration. Roads closed to public use, with the provision that they may be used for transmission line maintenance, would cause less damage.

Using existing road systems to the fullest extent possible would minimize impacts.

Subsequent Vegetation Treatment. Construction practices aimed at prolonging the period before vegetation disturbance is again required are economically advantageous and would minimize loss to productive capacity. Subsequent treatment of vegetation should consist mainly of conifer removal and avoid scarification and damage to herbs and shrubs. Promoting the harvesting of Christmas trees in the right-of-way may reduce the need for future clearing.

Scarified Areas. Drilling or hydroseeding scarified areas can be expected to slow site quality deterioration, inhibit conifer establishment, and increase forage value in forests. A mixture of seed and fertilizer can be hand-seeded (e.g., with a Cyclone seeder) on scarified areas where hydroseeding or drilling

is not feasible.

Herbicides. According to the applicant, no herbicides would be used during line construction and operation.

SOCIOECONOMIC ATTRIBUTES

Of concern here are the social structure of the community, social values, quality of life, and the economic circumstances of individuals, businesses, and communities. In many environmental assessments, immediately recognizeable and quantifiable socioeconomic impacts receive more attention than effects less quantifiable or which may become apparent only at some future time. Though difficult to evaluate, such intangible impacts are an integral part of man's social structure, and an effort must be made to define and understand them.

A rural state with low population and numerous natural attributes, Montana attracts a variety of people with divergent interests, personal values, and life styles. Conflicts of interest exist between people who desire an urban life style in a rural setting and people who are opposed to any urban-like development which they fear will degrade Montana's environmental quality. Achieving and maintaining a balance between the quality of life, as perceived by each individual, and natural resource utilization is difficult. This section examines the potential and long-term impacts of the proposed transmission line upon the social and economic conditions of the region. The study area for social and economic concerns is necessarily larger than that for physical environmental concerns.

Inventory

Because the Mount Vernon Mine impact statement prepared by the Forest Service of the U.S. Department of Agriculture and the Montana Department of State Lands (1978) contains a thorough description of the existing social and economic environment as well as detailed projections of the future environment with and without the mine, only a general summary is necessary here.

Historically, Lincoln County has been heavily dependent on the timber industry. Over the past 50 years there has been a decline in the relative economic importance in the county of agriculture, transportation, communications and public utilities, and wholesale and retail trade, and an increase in the importance of mining and contract construction. The most dramatic change was the rise in contract construction earnings due to activities connected with Libby Dam. Construction of Libby Dam started in 1966, and average annual employment went from 312 in that year to 1622 in 1969. The highest monthly peak was 2193 in August of 1970. Construction employment began tapering off in 1971, and the average employment in 1975 was down to 377. The Corps of Engineers has had active plans since then for further construction, including the addition of more turbines in Libby Dam and the construction of a reregulating dam (with generating units) downstream to mitigate the large fluctuations in flow associated with the operation of the main dam as a peaking plant. Only recently, however, has any construction taken place in connection with the reregulating reservoir, and in the interim it is likely that the original construction force has found other employment. Future construction schedules on this project are still un-

certain, in part due to environmental and social considerations and in part due to incomplete congressional funding.

The major industry in the county is manufacturing. As a source of income in the county, the share of total labor and proprietor's income provided by the manufacturing sector has gone from under 6 percent in 1929 to a high of 47 percent in 1965, after which it declined to just over 25 percent as construction on Libby Dam provided another major source of income. By 1976, it had risen again to 38 percent.

The bulk of manufacturing employment (around 90 percent) is in the wood products industry. The largest single employer in the wood products industry in Lincoln County is the St. Regis Paper Company; the rest are small operations. St. Regis owns 8 percent of the land in the county, compared with federal ownership of 72 percent, state ownership of 3 percent, and combined holdings of the three other major private landowners (Burlington Northern, Inc., Champion International, and Anaconda) of 7 percent. St. Regis is partially dependent on federal lands for its timber source. The other wood products firms are predominantly dependent upon public lands.

At present, the only major mining employer in the county is the W. R. Grace vermiculite facility in Libby.

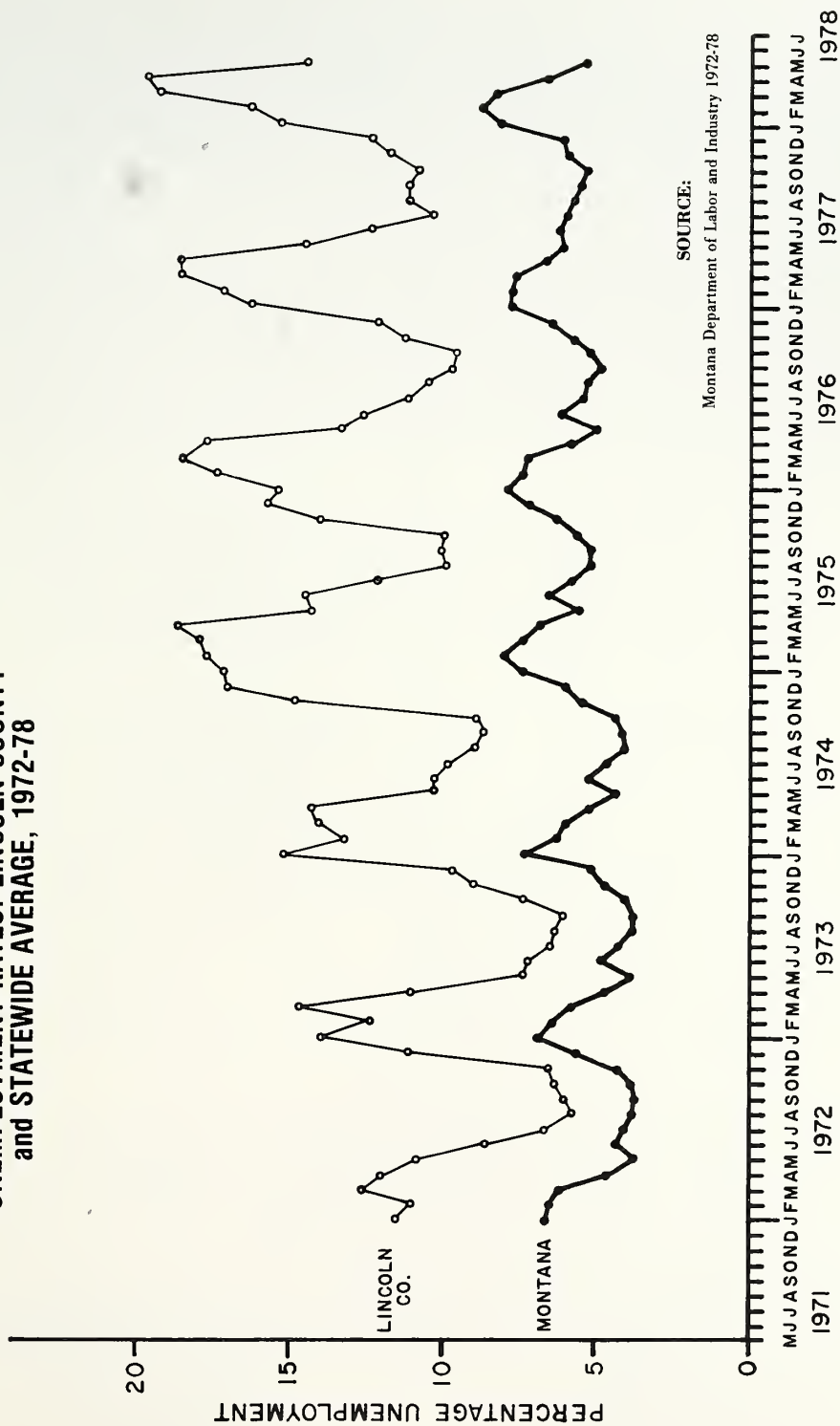
Historically, per capita income in Lincoln County has been lower than the Montana average, and unemployment has been higher. Some of the differential in unemployment is probably attributable to seasonal conditions in the timber industry. Figure 4 shows unemployment consistently higher and seasonal fluctuations consistently greater than the state average. The only years in the recent past when per capita income was above the state average were during peak construction at the dam, coincident with a period of low farm income which tended to lower the statewide figure.

Impacts and Mitigating Measures

General Social Impacts. The social impacts of the line would depend upon the perceptions of the individuals in the area. In addition to the purely visual impacts of the line, which are treated elsewhere in this report, the effect that the existence of the line would have on an individual would be related to his attitudes towards the activities associated with the consumption of electricity, and, if he is familiar with the particular line, upon his attitudes towards the particular facility or activities being served by that line. Opponents of the type of development served by this line may suffer social impacts by its existence, if they view it as an integral part of the project. Since the line extends some 18 miles from the project, it might provide a constant reminder of the project to opponents. Similarly, supporters of developments of this type might receive intangible benefits from its existence. Neither negative nor positive impacts of this type would be significant because, given the size and type of construction of this line, it is likely not to be conspicuous.

Population and Employment. Given the connection between the need for the proposed line and the opening of ASARCO's Mount Vernon Mine, the impacts of the proposed line must be considered in the context of the impacts associated with the proposed mine. Studies performed by the Montana Department of Community Affairs (USDA and Montana DSL 1978) indicate that, if the mine is

Figure 4
 UNEMPLOYMENT RATES: LINCOLN COUNTY
 and STATEWIDE AVERAGE, 1972-78



SOURCE:

Montana Department of Labor and Industry 1972-78

opened, the Lincoln County population will be 1 percent greater in 1978 than if it had not been, 4 percent greater in 1979 and 1980, and 6 percent greater after 1980. In the construction phase of the mine, this amounts to an additional 150-180 people in the Troy area (50 in the first year), 200-250 in the Libby area (70 in the first year), and an extra 230-290 in the Bull Lake area (80 in the first year). During the operational phase, the additional expected population is 250, 350, and 400, respectively, for the three areas.

The applicant expects that, for the duration of the four-to-six-month construction period, the contractors would bring in about twenty people from outside the area and hire about ten locally, compared with a peak construction employment of 220 for the plant and, eventually, one hundred construction employees for the mine. The construction period for the mill is two years; peak employment would occur about eight to thirteen months after construction starts. Development activity for the mine would take about 1½ years, with employment starting at forty-three and building up to one hundred over the development period, as shown in table 4.

If one assumes that the twenty construction workers to be brought in from outside would not bring their families with them, then the addition to the county's population associated with the power line is projected to be twenty, compared with approximately 200 associated with mine and plant construction. Averaged over the entire first year of the project, the power line construction population would add only 10 to the county population, or 5 percent of the equivalent figure for the mine and mill.

The impact associated with the power line primarily occurs during the construction of the line. Given the size of the construction work force engaged in opening the mine and building the associated facilities, the power line construction work force would represent a small increment of the construction period population increase (see table 4). Construction would be performed under contract. Experienced contractors for power lines are found in Kalispell and Helena, as well as elsewhere, and at least part of the construction crews would probably be imported, particularly since the local construction labor force is likely to be in high demand due to the coincident construction activity on the mine and the Libby reregulating dam. Imported construction crews would move into the area temporarily, adding to the demand for temporary housing and other services for the duration of their presence, and would contribute additional income to the area to the extent that they spend their earnings locally. This is not expected to be a significant addition to the impacts associated with the mine.

Fiscal Impact. The major fiscal impact during the construction period would be the small increase in income tax collections associated with the earnings of the construction crews. If these workers would otherwise have been employed elsewhere in the state, then only that part of the income taxes associated with higher earnings can be counted as increase. Likewise, if the workers accepted lower earnings in order to find a job in this area, total state income tax collections would actually be lower. If the workers would otherwise have been unemployed, then the full income taxes on their earnings should be credited to the projects, in addition to any reduction in unemployment or welfare payments. If the workers would otherwise have been employed out of state,

TABLE 4

HYPOTHETICAL EMPLOYMENT SEQUENCE FOR THE PROPOSED
TRANSMISSION LINE AND ASARCO'S PROPOSED PLANT AND MINE

Month	Power line	Mill	Mine	TOTAL
CONSTRUCTION PHASE				
1	30	100	0	130
2	30	117	0	147
3	30	135	0	165
4	30	152	0	182
5	30	170	0	200
6	30	187	0	217
7	0	205	43	248
8	0	220	46	266
9	0	220	49	269
10	0	220	53	273
11	0	220	56	276
12	0	220	59	279
13	0	220	62	282
14	0	209	65	274
15	0	198	68	266
16	0	187	72	259
17	0	176	75	251
18	0	165	78	243
19	0	154	81	235
20	0	143	84	227
21	0	132	87	219
22	0	121	91	212
23	0	110	95	205
24	0	100	100	200
OPERATION PHASE				
25 ^a	0	235 ^b	- ^b	235
26	0	235	-	235
27	0	235	-	235
28	0	235	-	235
29 ^c	0	310	-	310

NOTE: This hypothetical employment sequence assumes that construction of the power line and mill will both start in month 1, and of the mine, six months later so that both mill and mine will be ready at the same time. Under this assumption, in the first month, the power line will account for 23 percent of total project employment; in the second month, 20 percent; third, 18 percent; fourth, 16 percent; fifth, 15 percent; sixth, 14 percent. Under a different employment sequence, these relationships would be different.

^aMonths 25 through 28 constitute a limited production period.

^bFrom month 25 on, mill and mine employment are both shown in the "mill" column. The application did not differentiate between the two for the operation phase.

^cMonth 29 is shown as the first month of full production. Total employment of 310 for the mill and mine would continue after this time.

then only the full income tax collections should be counted.

During the operational phase of the line the major economic impact would be the property tax collections associated with the line. The estimated construction cost of the line is \$1,068,031, and the applicant estimates that their tax payments on the line would amount to \$12,576 per year.

Additional economic impacts may be associated with maintenance of the line. Outage data supplied by the applicant shows a total of fifteen outages on the existing distribution line from 1 to 9½ hours in duration between January 1973 and November 1977. Nine of these outages were tree related. Widening of the right-of-way is expected to reduce the number of tree-related outages on the distribution line, but the higher elevations and increased severity of weather conditions may increase the likelihood of outages on the section of line leading to the facilities on Mount Vernon; in addition, both the cost of repair and the duration of outages may be somewhat greater for the same reasons. Even so, repair and maintenance costs are not expected to result in significant income for Lincoln County. However, outages of several hours' duration in the power supply to the mine and concentrator would result in economic losses to ASARCO and to the work force. Union contracts and labor arrangements would determine the distribution of these losses to the respective parties.

Impact on the Cost of Electricity. The financial arrangements between ASARCO and the applicant for construction of the line, the price to be charged to ASARCO for the electricity consumed in mine and mill operations, and the role that the timing of the opening of the mine has on the amount of power that the Bonneville Power Administration will supply to the applicant in the future may affect the cost of electricity to the applicant's current and future members.

According to the proposal, the applicant will deal with the uncertainty of the timing of the mine's opening by not beginning construction until ASARCO indicates its intentions by advancing funds for the construction of the line. After construction, the applicant would give ASARCO an annual credit against its electric bill until the construction advance was repaid, without interest (Nordeen 1978). Thus, the applicant would ultimately pay for the line, but ASARCO would bear the interest cost on the money. The weighted average cost of REA and private financing to the applicant would be around 6.2 percent. The cost to ASARCO of this arrangement would be the lost use of the money. If ASARCO could invest the money internally for an after-tax return of 10 percent, than a preferable arrangement might be for the applicant to finance the line itself and have ASARCO reimburse the interest cost. This, however, would not satisfactorily deal with the question of which party would assume the risk; if the mine were to shut down at some point after construction, the burden of repaying the loan for a line which generated no income to the applicant might fall to the rest of the customers and members of the coop. The normal method of financing a project of this type for a profit-making firm would be to make an investment to serve a new customer only if the net revenue to be received from service to that customer would be sufficient to earn reasonable return on the investment. Had this line been proposed by a private utility, for instance, the utility would normally build the line and require the customer to guarantee a minimum consumption over the ensuing years to generate a volume of revenues sufficient to justify the investment in the line. The procedure here seems to be the

the new right-of-way were to lie through mature timber, there would be no difference in land productivity between the two approaches. If the timber on the new right-of-way were too small for commercial harvest, there could be a once-over loss associated with the clearing of the new right-of-way. Once the old line is taken out and the abandoned right-of-way reseeds, there would be no further loss over time.

The impact on forested land is discussed further in the vegetation section of this chapter.

In summary, the main impacts of this transmission line, considering land use only and excluding visual and timber considerations, would be:

- 1) Interference with television and radio reception and the production of audible noise near occupied buildings;
- 2) Minor obstruction of haying operations;
- 3) Nuisance impact to landowners, especially during construction, along access roads, gated areas, and at construction sites; these would include temporary noise and dust;
- 4) Possible opening up of small amounts of recreational land along new access roads; possible closure of other roads.

The remaining land use impacts can almost entirely be mitigated by proper routing, design, and construction of the line.

VISUAL CONCERNS

Appendix V of the joint state-federal draft EIS on ASARCO's proposed Mount Vernon Mine (USDA and Montana DSL 1978) describes the visual setting of the applicant's proposed and alternative line routes. Because that description is easily available, it will not be repeated here. Instead, the following discussion will treat only the potential visual impacts of the proposed line and measures which could be taken to mitigate them.

Figure 7 was compiled following field observations during the fall, winter, and spring, 1977-78, along the roads that closely paralleled all alternative routes. An attempt was made to visualize the 115-kV poles and conductors at all scenic sites. In addition, U.S. Forest Service maps were examined.

Over the past decade or so, transmission lines have become more controversial. As the size and number of lines increase, society is changing its mental perception of such facilities. Transmission and distribution lines are no longer viewed as status symbols or symbols of "progress" as they were in the earlier years of electrical use. Greater concern for protecting the visual character of the landscape is at the root of much of this new-found controversy. In essence, electrical transmission lines are often viewed as ugly or out-of-place with the existing visual character of the landscape.

A visual impact can be the result of the size or context of the line itself or of the expectation of the viewer. A high-voltage line on large steel towers marching across an open landscape with a beautiful mountain in the background has a high visual impact, not just because of the size of the structure, but also because of its context--it intrudes into an otherwise natural scene. In general, a line would be less "out of place" around altered

landscapes dominated by man-made features, such as urban and industrial areas. To most persons, certain kinds of landscapes accept a transmission line with less visual impact than others--for instance, through years of experience, most people have been conditioned to accept utility poles along highways and railroad tracks. On the other hand, in a national park or a wilderness area, people would not expect to see a transmission line--visual impact, either positive or negative, is produced in part by seeing what is not expected.

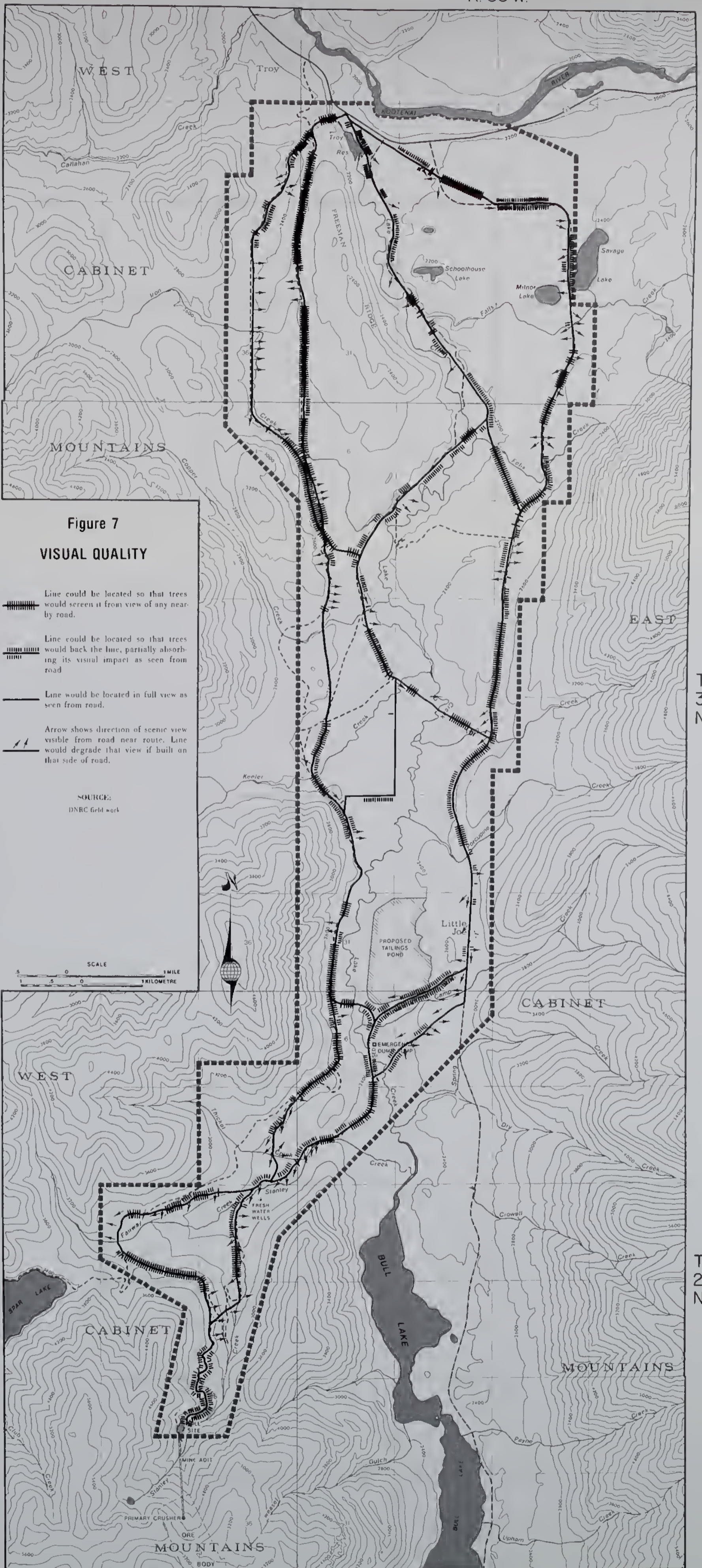
In the Troy-ASARCO study area, the proposed transmission line would not be much more visually intrusive than are the power distribution lines which follow most of the main paved roads. Its poles would be slightly larger than those of the distribution line and the existing 12.47-kV transmission line, and the poles would be wooden. Thus, the main increase in visual impact caused by the new line would occur where it would intrude into areas of great beauty, where any visual degradation would be immediately noticeable to most viewers. These areas of beauty, occurring in the Lake Creek and Stanley Creek valleys for the most part, would be of two types: (1) spectacular views with stream, lake, or forest in the fore- and midground and the high peaks of the Cabinet Mountains in the background and (2) pastoral views with green pasture or meadow, neat farm buildings or old log cabins, and pleasant arrangements of trees, shrubs, and streams.

Among much of the length of all the alternative routes, the line and nearby roadways lead through dense timber (mostly second growth on land logged 20 or more years ago), and views of the line from the roads would be limited to the trees flanking the roads and a narrow "tunnel view" along the cleared roadway. Thus, spectacular overviews are few and are appreciated all the more. For travelers such as tourists passing through the Lake Creek Valley or driving up the Spar Lake Road, the proposed line would be intrusive wherever good viewpoints occur. People who live or work in the area and use the road regularly, on the other hand, would probably see the line more as a necessary and functional part of the landscape; they might well appreciate the beautiful scenes of the Cabinet Mountains as much or more than the casual visitor but be so accustomed to the line that they are not consciously aware of it.

Table 5 (p. 66) shows the number of occupied residences within 0.3 km (0.2 mi) of the main alternative route, giving an approximate and relative measure of the negative visual impact along the alternate routes.

All of the proposed routes more or less follow existing roads or roads to be built for the mining and concentrating operations, and the line would be seen mainly by persons traveling on the roads. Therefore, the visual quality map (figure 7) portrays information about views of the line as it would appear from the nearest road. The map shows all viewpoints of high visual quality or interest along alternative routes and indicates if the line would significantly detract from or intrude upon those views. It also shows where the line would be effectively blocked from view of the road by intervening trees or other obstacles, and where the line would be in view but closely backed by trees high and dense enough to visually absorb the line.

In general, the existing transmission and distribution lines in the study area along the alternative routes are of low impact. For most of their length the lines are blocked from view by trees and are relatively inconspicuous. The larger proposed line would be essentially identical and would not call the viewer's attention to itself. In most places where there are open views (see figure



7) with the line on the view side of the road, the line would be sufficiently close to the road that the viewer would look under it, making it inconspicuous. There are, however, points along most of the alternative routes where the line would necessarily be within a field of view containing attractive visual elements. Here, the negative impact would be greatest where the line passes immediately between the viewer and the center of attraction. Where the line is in sight but away from (usually below) the center of attention, the impact would be greatly lessened.

Recommendations made in USDA and Montana DSL 1978 to mitigate possible visual impact of the line include: (1) screen with plantings the Troy Substation and several tunnel views along the proposed line and (2) slightly shift the route near several viewpoints and residences in order to minimize the visual impact of the line. The desires of the local landowners and residents should be considered when making any such minor centerline adjustments.

WILDLIFE

Whether considered as a commodity, as a resource which exists to be exploited, or as an integral part of a community of interrelated living things, wildlife is accepted as an important concern, and land use decisions which may affect wildlife deserve careful consideration.

Inventory

The study area provides a wide array of productive habitats which harbor diverse and abundant wildlife communities. At least 112 species of birds and 29 of mammals are found within 8 km (5 mi) of the study area (Skaar 1975, Hall and Kelson 1959, USDA and Montana DSL 1978). However, only those few species which available evidence indicates may significantly be affected by the proposed facility are of concern to this report. The significance of potential impact is best thought of in terms of measurable, long-term changes in carrying capacity of the environment (or optimum long-term numbers) (Sharma et al. 1975). Thus, if 100 ground squirrels or house sparrows should be destroyed, the impact to the total population would be short term and not significant, because the population would recover quickly and carrying capacity would not be affected. If five osprey or five moose were destroyed, the impact could be long-term and hence more significant, since these species are relatively scarce and have lower recovery rates, but carrying capacity would still not be affected. If nesting habitat for five osprey were destroyed, the impact to the population would be long term, and carrying capacity would be reduced, resulting in a significant impact.

The study area has been included in the ASARCO project baseline wildlife study (USDA and Montana DSL 1978), which provides adequate data for route selection and impact assessment. These data will be only briefly summarized here; more detailed information, including distribution maps, may be found in USDA and Montana DSL 1978.

Waterfowl populations are not large in the study area at any season, although 20 species have been reported for the region; most are confined to Bull Lake and Lake Creek. Fifteen species of raptors inhabit this general area. The most frequently observed raptor was the osprey, which nests in the study area; nesting was not confirmed for other raptors, although several

additional species probably nest in the area. The endangered bald eagle and peregrine falcon occur in the area in small numbers and only during migration or winter.

Large mammals found in the study area include the black bear, mountain lion, mule deer, white-tailed deer, moose, elk, and mountain goat; all are classified as big game species by the Montana Department of Fish and Game (1977). Black bears frequent the Stanley Creek and upper Lake Creek valleys and adjacent foothills, preferring densely timbered habitats. The study area includes no "core" grizzly bear habitat as delineated by the U.S. Forest Service. Mountain lions are rare, but the study area is apparently included in the home range of several individuals. Elk occur in the southern half of the study area, although numbers are fairly low; they were most frequently seen at the juncture of Highway 56 and the proposed access road. Seasonal movements and distribution of elk are poorly known. Both mule and white-tailed deer inhabit the study area; the former species is apparently the less abundant of the two and is most frequently observed along Stanley Creek. White-tailed deer are distributed throughout the study area, with moderate concentrations noted along lower Keeler Creek and Stanley Creek. Moose are rare but wide-ranging in the Stanley and Lake Creek valleys. The principal mountain goat concentrations are found to the south of the study area, but a few goats may use the upper Stanley Creek area in the vicinity of the proposed mine.

While many nongame, predatory, and furbearing species inhabit the study area, none are likely to be significantly affected by the proposed transmission line.

Impacts and Mitigating Measures

Possible impacts of transmission lines upon wildlife have been discussed in detail by Thompson (1977). Those which apply to the proposed project and particular species inhabiting the study area which may be affected are discussed below. Potential effects of the proposed transmission line upon wildlife populations may be grouped into four broad categories: disturbance by construction, habitat changes brought about by timber removal, collisions of birds with wires, and line-related human access.

Construction-related disturbance. Construction crews and timber-clearing operations can cause short-term displacement of birds and mammals, particularly larger mammals and large raptorial birds. This is expected to be insignificant where the centerline parallels existing roads except in the case of nesting raptors, as disturbance near the nesting site could result in loss of eggs or young or even nest abandonment. At least one osprey nest in the study area is believed to have been abandoned due to logging-related disturbance. Although no active raptor nests have been found within 0.3 km (0.5 mi) of the centerline, it is likely that further study would reveal nest sites vulnerable to disturbance.

Potential construction-related impacts to nesting raptors can be mitigated or prevented by prohibiting construction in the vicinity of active nests until young have fledged. Timber clearing and road construction should not take place during winter in areas where wintering elk and deer are present.

Changes in Habitat Resulting from Timber Clearing. Removal of the forest canopy to accomodate poles and wires changes both habitat configuration and the availability of food and cover to animals using that habitat. This may improve or degrade habitat suitability, depending upon the particular species involved. It is likely that few trees would be removed from the right-of-way where the older distribution line is simply being replaced; here habitat changes would be small and would not affect vertebrate populations significantly. However, where new lines and access roads must be built, timber clearing and road construction could result in large-scale habitat alteration.

The southern five miles of the study area includes dense, moist forests, predominantly seral stages of the western redcedar-western hemlock/queencup beadlily habitat types. These are among the most mesic habitats in Montana and support a luxuriant shrubby understory providing abundant browse and cover. Timber clearing in these types may well stimulate browse production, but browse availability is probably not limiting to mule deer and elk in these situations, and any increase in browse production is likely to be offset by effects on browse availability of the proposed access road parallel to the centerline (see below). The effects of these habitat changes on populations of smaller birds and mammals are not likely to be significant.

Slash piling along the right-of-way may impede movements of large ungulates, and such slash should be disposed of soon after right-of-way clearing.

Collisions of Birds with Wires. Crossing of Lake Creek by the line would create the risk of collisions of waterfowl and other riparian birds with the wires during storms or heavy fog. This would be likely to be a small but long-term source of avian mortality and could be mitigated by reducing the number of crossings of Lake Creek.

Effects of Increased Human Access. Normally, long-term disturbance of large vertebrates by traffic or other human activity would be of minor significance in an area such as this, where use of the roads would not be heavy and where access roads could easily be closed. Also, most of the applicant's preferred route parallels an existing road which would be used for line access. However, the problem of line-related access is compounded in its effect on wildlife by the proposed all-weather mine access road, which would parallel the line from Highway 56 to the plant site. The disturbance to vertebrates, particularly large ungulates, by the heavy traffic on this road could be considerable, and would be expected to reduce animal use of the area--and hence carrying capacity. The potential effects of line-related access in this case would be clearly overshadowed by the effects of the mine access road, and could be mitigated only by keeping the line and mine access road in the same right-of-way, as proposed. Should the proposed mine access road not be built, the effects of traffic on smaller line access roads could perhaps be mitigated by judicious centerline siting.

SUBSTRATE SUITABILITY

A field survey of surficial geology and mass-failure hazards was made of the study area in November 1977 and spring 1978, and the data were used in figure 8. Also plotted on this map are those areas potentially unsuitable for pole placement.

Ground Stability

Most portions of the alternative transmission line routes pass across flat or gently sloping land (up to 5°) that is well drained. These areas pose no engineering, slope instability, or soil erosion constraints to the construction and maintenance of the line.

In a number of places, post-glacial stream erosion along Lake Creek, Stanley Creek, Iron Creek, and other small streams, has cut into glacial lake silt and clay beds and formed steeper slopes (greater than about 15°) (see figure 8). Locally, these slopes are unstable and have slumped downward; an example occurs in Lake Creek Valley in bluffs on the east side of Lake Creek Road, beginning about 1.4 km (0.9 mi) south of its intersection with Highway 2 and continuing south along the line of bluffs past Falls Creek for more than 3 km (2 mi). Other areas of similar slumps are seen on stereo aerial photographs of the study area, but some of these are difficult to recognize on the ground because dense forest and shrub ground cover conceals the characteristic hummocky ground of the slumps and the amphitheater-shaped hollows upslope from the slump blocks. All the slumps recognized in the field or on photos lie along eroded, over-steepened edges of lake bed terraces.

In the east half of section 30, T31N, R33W (near the north end of the bluffs described above), several poles on the existing 12.47 kV transmission line are tilted off vertical, probably because they ride on active rotational slump blocks.

Unstable ground of this type calls for careful construction and routing of the line. Poles should be located away from the edges of potentially unstable slopes. In many places, the unstable slope is short enough to be spanned, placing no poles on the slope itself (the tilted poles in section 30 described above are placed where the line is parallel to and halfway up the unstable slope).

In the valley of Stanley Creek, the applicant's preferred route ascends from the valley bottom up a steep, recently clearcut slope to a topographic bench (here interpreted as a glacial ice-margin terrace) high above and west of the creek. This slope, and the slopes above the bench, are potentially unstable and potentially subject to landslides or accelerated soil creep. Stable quartzite and argillite bedrock on the steep mountainside is locally covered with many meters of lodgement till (deposited by a glacier). The till would be especially susceptible to mass failure where wetted by springs, rain, or melting snow. Dames and Moore (1974) report a 1974 landslide which started on the steep slope above the bench in the vicinity of the proposed ASARCO office site and plant site. No landslides or direct evidence of high rates of soil creep were noted in the field or in looking at aerial photos for the present study along the preferred route of the transmission line in the valley of upper Stanley Creek. Nonetheless, care should be taken to seat the transmission poles solidly on this slope, in order to increase the long-term reliability of the line.

The study area lies in the intermountain seismic belt and is potentially subject to strong earthquakes. Earthquake damage to the line is not considered a significant problem, nor would it lead to significant impacts on the natural environment. Clearly, however, the reliability of the line, like all those in the intermountain seismic belt, is lessened, and long-range contingency plans by the applicants and ASARCO for power outages should consider the likelihood of earthquake damage.

Soil Erosion

Given proper construction and reclamation measures, soil erosion is not a serious or even significant problem on slopes in the study area except near stream crossings (which are discussed on page 45). Revegetation of ground bared by construction activities is rapid in the study area because of the relatively moist oceanic climate. Soil erosion in and near the study area is insignificant except where large areas have been roaded and clearcut (such as in the Keeler Creek drainage).

Substrate Suitability on Alternate Routes

Table 5, which compares the distance on each alternative route that would require new roads, gives an approximate and relative measure of the soil erosion impacts on the alternative routes; because the little soil erosion which will occur will be mainly on new roads, and mainly during the construction period before paving, sediment bars and other mitigative measures can be installed. Soil erosion is not here considered a major impact of the line, regardless of which alternative route is selected.

Because proper construction and routing can reduce to insignificance the adverse impact of areas of active and potential slumps, landslides, and soil erosion, the alternative routes (except near streams) were not further evaluated on the basis of substrate suitability.

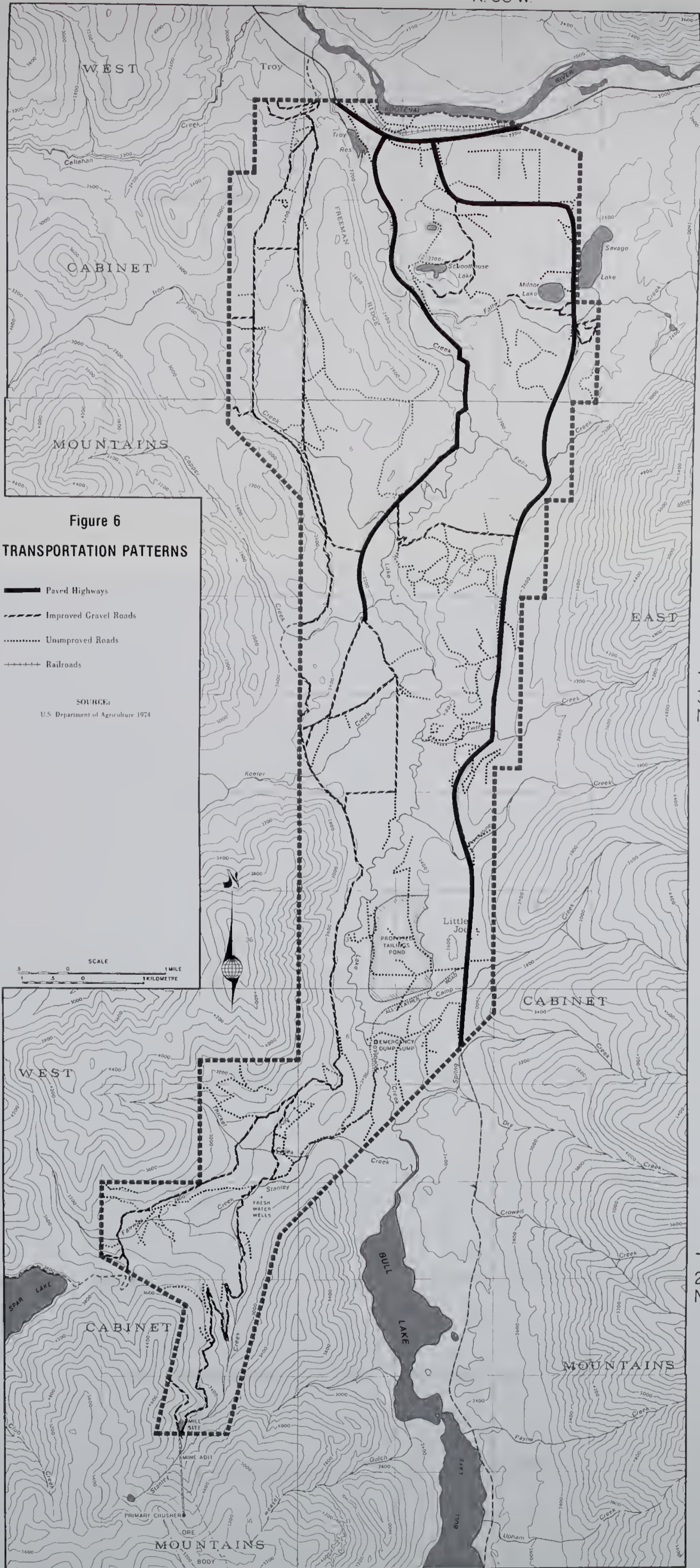
R. 34 W.

R. 33 W.

T. 31 N.

T. 30 N.

T. 29 N.





the new right-of-way were to lie through mature timber, there would be no difference in land productivity between the two approaches. If the timber on the new right-of-way were too small for commercial harvest, there could be a once-over loss associated with the clearing of the new right-of-way. Once the old line is taken out and the abandoned right-of-way reseeds, there would be no further loss over time.

The impact on forested land is discussed further in the vegetation section of this chapter.

In summary, the main impacts of this transmission line, considering land use only and excluding visual and timber considerations, would be:

- 1) Interference with television and radio reception and the production of audible noise near occupied buildings;
- 2) Minor obstruction of haying operations;
- 3) Nuisance impact to landowners, especially during construction, along access roads, gated areas, and at construction sites; these would include temporary noise and dust;
- 4) Possible opening up of small amounts of recreational land along new access roads; possible closure of other roads.

The remaining land use impacts can almost entirely be mitigated by proper routing, design, and construction of the line.

VISUAL CONCERNS

Appendix V of the joint state-federal draft EIS on ASARCO's proposed Mount Vernon Mine (USDA and Montana DSL 1978) describes the visual setting of the applicant's proposed and alternative line routes. Because that description is easily available, it will not be repeated here. Instead, the following discussion will treat only the potential visual impacts of the proposed line and measures which could be taken to mitigate them.

Figure 7 was compiled following field observations during the fall, winter, and spring, 1977-78, along the roads that closely paralleled all alternative routes. An attempt was made to visualize the 115-kV poles and conductors at all scenic sites. In addition, U.S. Forest Service maps were examined.

Over the past decade or so, transmission lines have become more controversial. As the size and number of lines increase, society is changing its mental perception of such facilities. Transmission and distribution lines are no longer viewed as status symbols or symbols of "progress" as they were in the earlier years of electrical use. Greater concern for protecting the visual character of the landscape is at the root of much of this new-found controversy. In essence, electrical transmission lines are often viewed as ugly or out-of-place with the existing visual character of the landscape.

A visual impact can be the result of the size or context of the line itself or of the expectation of the viewer. A high-voltage line on large steel towers marching across an open landscape with a beautiful mountain in the background has a high visual impact, not just because of the size of the structure, but also because of its context--it intrudes into an otherwise natural scene. In general, a line would be less "out of place" around altered

landscapes dominated by man-made features, such as urban and industrial areas. To most persons, certain kinds of landscapes accept a transmission line with less visual impact than others--for instance, through years of experience, most people have been conditioned to accept utility poles along highways and railroad tracks. On the other hand, in a national park or a wilderness area, people would not expect to see a transmission line--visual impact, either positive or negative, is produced in part by seeing what is not expected.

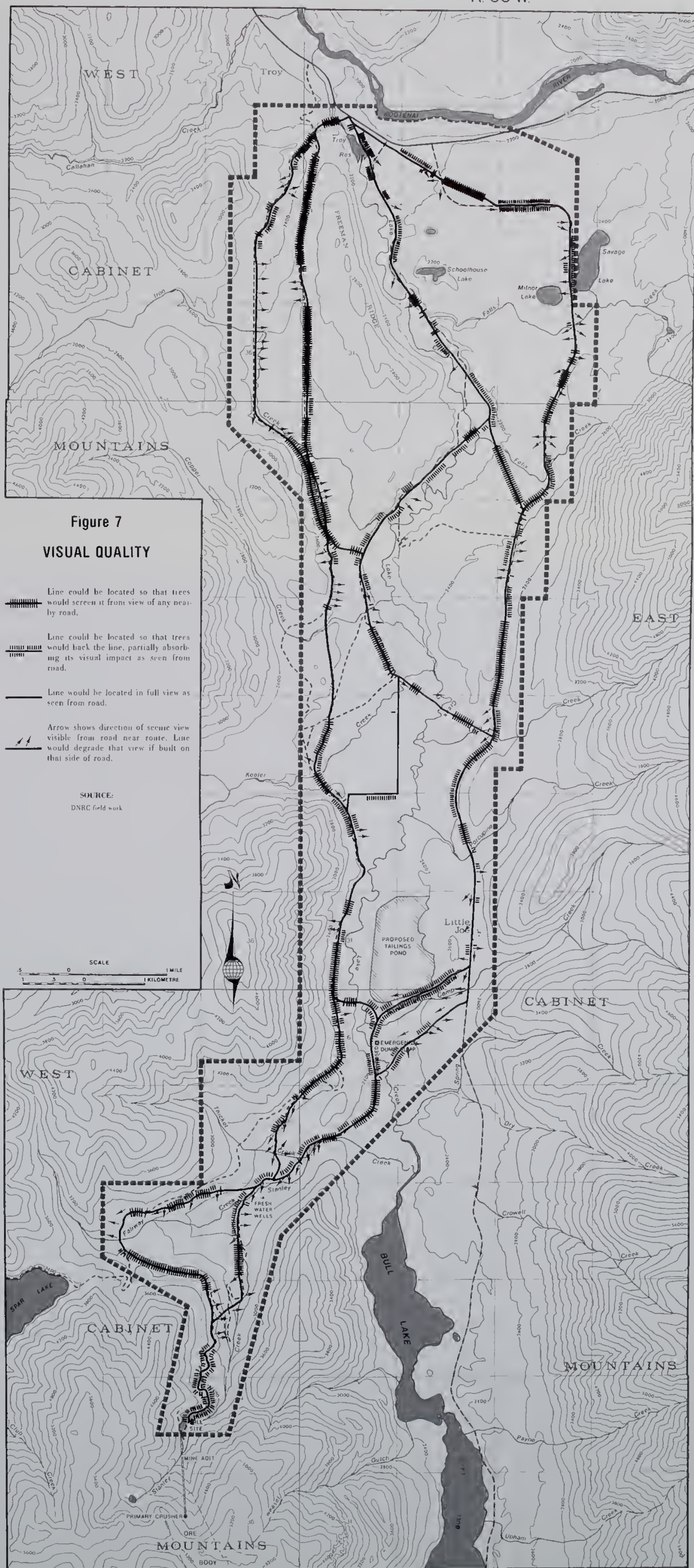
In the Troy-ASARCO study area, the proposed transmission line would not be much more visually intrusive than are the power distribution lines which follow most of the main paved roads. Its poles would be slightly larger than those of the distribution line and the existing 12.47-kV transmission line, and the poles would be wooden. Thus, the main increase in visual impact caused by the new line would occur where it would intrude into areas of great beauty, where any visual degradation would be immediately noticeable to most viewers. These areas of beauty, occurring in the Lake Creek and Stanley Creek valleys for the most part, would be of two types: (1) spectacular views with stream, lake, or forest in the fore- and midground and the high peaks of the Cabinet Mountains in the background and (2) pastoral views with green pasture or meadow, neat farm buildings or old log cabins, and pleasant arrangements of trees, shrubs, and streams.

Among much of the length of all the alternative routes, the line and nearby roadways lead through dense timber (mostly second growth on land logged 20 or more years ago), and views of the line from the roads would be limited to the trees flanking the roads and a narrow "tunnel view" along the cleared roadway. Thus, spectacular overviews are few and are appreciated all the more. For travelers such as tourists passing through the Lake Creek Valley or driving up the Spar Lake Road, the proposed line would be intrusive wherever good viewpoints occur. People who live or work in the area and use the road regularly, on the other hand, would probably see the line more as a necessary and functional part of the landscape; they might well appreciate the beautiful scenes of the Cabinet Mountains as much or more than the casual visitor but be so accustomed to the line that they are not consciously aware of it.

Table 5 (p. 66) shows the number of occupied residences within 0.3 km (0.2 mi) of the main alternative route, giving an approximate and relative measure of the negative visual impact along the alternate routes.

All of the proposed routes more or less follow existing roads or roads to be built for the mining and concentrating operations, and the line would be seen mainly by persons traveling on the roads. Therefore, the visual quality map (figure 7) portrays information about views of the line as it would appear from the nearest road. The map shows all viewpoints of high visual quality or interest along alternative routes and indicates if the line would significantly detract from or intrude upon those views. It also shows where the line would be effectively blocked from view of the road by intervening trees or other obstacles, and where the line would be in view but closely backed by trees high and dense enough to visually absorb the line.

In general, the existing transmission and distribution lines in the study area along the alternative routes are of low impact. For most of their length the lines are blocked from view by trees and are relatively inconspicuous. The larger proposed line would be essentially identical and would not call the viewer's attention to itself. In most places where there are open views (see figure





7) with the line on the view side of the road, the line would be sufficiently close to the road that the viewer would look under it, making it inconspicuous. There are, however, points along most of the alternative routes where the line would necessarily be within a field of view containing attractive visual elements. Here, the negative impact would be greatest where the line passes immediately between the viewer and the center of attraction. Where the line is in sight but away from (usually below) the center of attention, the impact would be greatly lessened.

Recommendations made in USDA and Montana DSL 1978 to mitigate possible visual impact of the line include: (1) screen with plantings the Troy Substation and several tunnel views along the proposed line and (2) slightly shift the route near several viewpoints and residences in order to minimize the visual impact of the line. The desires of the local landowners and residents should be considered when making any such minor centerline adjustments.

WILDLIFE

Whether considered as a commodity, as a resource which exists to be exploited, or as an integral part of a community of interrelated living things, wildlife is accepted as an important concern, and land use decisions which may affect wildlife deserve careful consideration.

Inventory

The study area provides a wide array of productive habitats which harbor diverse and abundant wildlife communities. At least 112 species of birds and 29 of mammals are found within 8 km (5 mi) of the study area (Skaar 1975, Hall and Kelson 1959, USDA and Montana DSL 1978). However, only those few species which available evidence indicates may significantly be affected by the proposed facility are of concern to this report. The significance of potential impact is best thought of in terms of measurable, long-term changes in carrying capacity of the environment (or optimum long-term numbers) (Sharma et al. 1975). Thus, if 100 ground squirrels or house sparrows should be destroyed, the impact to the total population would be short term and not significant, because the population would recover quickly and carrying capacity would not be affected. If five osprey or five moose were destroyed, the impact could be long-term and hence more significant, since these species are relatively scarce and have lower recovery rates, but carrying capacity would still not be affected. If nesting habitat for five osprey were destroyed, the impact to the population would be long term, and carrying capacity would be reduced, resulting in a significant impact.

The study area has been included in the ASARCO project baseline wildlife study (USDA and Montana DSL 1978), which provides adequate data for route selection and impact assessment. These data will be only briefly summarized here; more detailed information, including distribution maps, may be found in USDA and Montana DSL 1978.

Waterfowl populations are not large in the study area at any season, although 20 species have been reported for the region; most are confined to Bull Lake and Lake Creek. Fifteen species of raptors inhabit this general area. The most frequently observed raptor was the osprey, which nests in the study area; nesting was not confirmed for other raptors, although several

additional species probably nest in the area. The endangered bald eagle and peregrine falcon occur in the area in small numbers and only during migration or winter.

Large mammals found in the study area include the black bear, mountain lion, mule deer, white-tailed deer, moose, elk, and mountain goat; all are classified as big game species by the Montana Department of Fish and Game (1977). Black bears frequent the Stanley Creek and upper Lake Creek valleys and adjacent foothills, preferring densely timbered habitats. The study area includes no "core" grizzly bear habitat as delineated by the U.S. Forest Service. Mountain lions are rare, but the study area is apparently included in the home range of several individuals. Elk occur in the southern half of the study area, although numbers are fairly low; they were most frequently seen at the juncture of Highway 56 and the proposed access road. Seasonal movements and distribution of elk are poorly known. Both mule and white-tailed deer inhabit the study area; the former species is apparently the less abundant of the two and is most frequently observed along Stanley Creek. White-tailed deer are distributed throughout the study area, with moderate concentrations noted along lower Keeler Creek and Stanley Creek. Moose are rare but wide-ranging in the Stanley and Lake Creek valleys. The principal mountain goat concentrations are found to the south of the study area, but a few goats may use the upper Stanley Creek area in the vicinity of the proposed mine.

While many nongame, predatory, and furbearing species inhabit the study area, none are likely to be significantly affected by the proposed transmission line.

Impacts and Mitigating Measures

Possible impacts of transmission lines upon wildlife have been discussed in detail by Thompson (1977). Those which apply to the proposed project and particular species inhabiting the study area which may be affected are discussed below. Potential effects of the proposed transmission line upon wildlife populations may be grouped into four broad categories: disturbance by construction, habitat changes brought about by timber removal, collisions of birds with wires, and line-related human access.

Construction-related disturbance. Construction crews and timber-clearing operations can cause short-term displacement of birds and mammals, particularly larger mammals and large raptorial birds. This is expected to be insignificant where the centerline parallels existing roads except in the case of nesting raptors, as disturbance near the nesting site could result in loss of eggs or young or even nest abandonment. At least one osprey nest in the study area is believed to have been abandoned due to logging-related disturbance. Although no active raptor nests have been found within 0.3 km (0.5 mi) of the centerline, it is likely that further study would reveal nest sites vulnerable to disturbance.

Potential construction-related impacts to nesting raptors can be mitigated or prevented by prohibiting construction in the vicinity of active nests until young have fledged. Timber clearing and road construction should not take place during winter in areas where wintering elk and deer are present.

Changes in Habitat Resulting from Timber Clearing. Removal of the forest canopy to accomodate poles and wires changes both habitat configuration and the availability of food and cover to animals using that habitat. This may improve or degrade habitat suitability, depending upon the particular species involved. It is likely that few trees would be removed from the right-of-way where the older distribution line is simply being replaced; here habitat changes would be small and would not affect vertebrate populations significantly. However, where new lines and access roads must be built, timber clearing and road construction could result in large-scale habitat alteration.

The southern five miles of the study area includes dense, moist forests, predominantly seral stages of the western redcedar-western hemlock/queencup beadrily habitat types. These are among the most mesic habitats in Montana and support a luxuriant shrubby understory providing abundant browse and cover. Timber clearing in these types may well stimulate browse production, but browse availability is probably not limiting to mule deer and elk in these situations, and any increase in browse production is likely to be offset by effects on browse availability of the proposed access road parallel to the centerline (see below). The effects of these habitat changes on populations of smaller birds and mammals are not likely to be significant.

Slash piling along the right-of-way may impede movements of large ungulates, and such slash should be disposed of soon after right-of-way clearing.

Collisions of Birds with Wires. Crossing of Lake Creek by the line would create the risk of collisions of waterfowl and other riparian birds with the wires during storms or heavy fog. This would be likely to be a small but long-term source of avian mortality and could be mitigated by reducing the number of crossings of Lake Creek.

Effects of Increased Human Access. Normally, long-term disturbance of large vertebrates by traffic or other human activity would be of minor significance in an area such as this, where use of the roads would not be heavy and where access roads could easily be closed. Also, most of the applicant's preferred route parallels an existing road which would be used for line access. However, the problem of line-related access is compounded in its effect on wildlife by the proposed all-weather mine access road, which would parallel the line from Highway 56 to the plant site. The disturbance to vertebrates, particularly large ungulates, by the heavy traffic on this road could be considerable, and would be expected to reduce animal use of the area--and hence carrying capacity. The potential effects of line-related access in this case would be clearly overshadowed by the effects of the mine access road, and could be mitigated only by keeping the line and mine access road in the same right-of-way, as proposed. Should the proposed mine access road not be built, the effects of traffic on smaller line access roads could perhaps be mitigated by judicious centerline siting.

SUBSTRATE SUITABILITY

A field survey of surficial geology and mass-failure hazards was made of the study area in November 1977 and spring 1978, and the data were used in figure 8. Also plotted on this map are those areas potentially unsuitable for pole placement.

Ground Stability

Most portions of the alternative transmission line routes pass across flat or gently sloping land (up to 5°) that is well drained. These areas pose no engineering, slope instability, or soil erosion constraints to the construction and maintenance of the line.

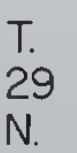
In a number of places, post-glacial stream erosion along Lake Creek, Stanley Creek, Iron Creek, and other small streams, has cut into glacial lake silt and clay beds and formed steeper slopes (greater than about 15°) (see figure 8). Locally, these slopes are unstable and have slumped downward; an example occurs in Lake Creek Valley in bluffs on the east side of Lake Creek Road, beginning about 1.4 km (0.9 mi) south of its intersection with Highway 2 and continuing south along the line of bluffs past Falls Creek for more than 3 km (2 mi). Other areas of similar slumps are seen on stereo aerial photographs of the study area, but some of these are difficult to recognize on the ground because dense forest and shrub ground cover conceals the characteristic hummocky ground of the slumps and the amphitheater-shaped hollows upslope from the slump blocks. All the slumps recognized in the field or on photos lie along eroded, over-steepened edges of lake bed terraces.

In the east half of section 30, T31N, R33W (near the north end of the bluffs described above), several poles on the existing 12.47 kV transmission line are tilted off vertical, probably because they ride on active rotational slump blocks.

Unstable ground of this type calls for careful construction and routing of the line. Poles should be located away from the edges of potentially unstable slopes. In many places, the unstable slope is short enough to be spanned, placing no poles on the slope itself (the tilted poles in section 30 described above are placed where the line is parallel to and halfway up the unstable slope).

In the valley of Stanley Creek, the applicant's preferred route ascends from the valley bottom up a steep, recently clearcut slope to a topographic bench (here interpreted as a glacial ice-margin terrace) high above and west of the creek. This slope, and the slopes above the bench, are potentially unstable and potentially subject to landslides or accelerated soil creep. Stable quartzite and argillite bedrock on the steep mountainside is locally covered with many meters of lodgement till (deposited by a glacier). The till would be especially susceptible to mass failure where wetted by springs, rain, or melting snow. Dames and Moore (1974) report a 1974 landslide which started on the steep slope above the bench in the vicinity of the proposed ASARCO office site and plant site. No landslides or direct evidence of high rates of soil creep were noted in the field or in looking at aerial photos for the present study along the preferred route of the transmission line in the valley of upper Stanley Creek. Nonetheless, care should be taken to seat the transmission poles solidly on this slope, in order to increase the long-term reliability of the line.

The study area lies in the intermountain seismic belt and is potentially subject to strong earthquakes. Earthquake damage to the line is not considered a significant problem, nor would it lead to significant impacts on the natural environment. Clearly, however, the reliability of the line, like all those in the intermountain seismic belt, is lessened, and long-range contingency plans by the applicants and ASARCO for power outages should consider the likelihood of earthquake damage.



Soil Erosion

Given proper construction and reclamation measures, soil erosion is not a serious or even significant problem on slopes in the study area except near stream crossings (which are discussed on page 45). Revegetation of ground bared by construction activities is rapid in the study area because of the relatively moist oceanic climate. Soil erosion in and near the study area is insignificant except where large areas have been roaded and clearcut (such as in the Keeler Creek drainage).

Substrate Suitability on Alternate Routes

Table 5, which compares the distance on each alternative route that would require new roads, gives an approximate and relative measure of the soil erosion impacts on the alternative routes; because the little soil erosion which will occur will be mainly on new roads, and mainly during the construction period before paving, sediment bars and other mitigative measures can be installed. Soil erosion is not here considered a major impact of the line, regardless of which alternative route is selected.

Because proper construction and routing can reduce to insignificance the adverse impact of areas of active and potential slumps, landslides, and soil erosion, the alternative routes (except near streams) were not further evaluated on the basis of substrate suitability.

CHAPTER FIVE

EVALUATION OF ALTERNATIVE ROUTES

This chapter compares the alternative routes, including the applicant's preferred and alternative routes and additional routes identified by the DNRC, in relation to the environmental concerns described in chapter four. These alternative routes are shown in figure 9 and will be identified by the appropriate letter sequence keyed to this figure. They are described in table 5.

In the following discussion, areas of significant impact risk within the alternative routes are identified for each concern. These impacts are dependent upon pole placement, methods of construction, timing of construction, and adherence to mitigating measures. Since some leeway in actual line placement is allowed, it is not possible to predict the exact nature and magnitude of actual impacts which will result from line construction. Rather, this section addresses the potential for adverse impact within alternative routes, recognizing that potential impacts can in many cases be mitigated or prevented.

In the comparison of alternatives, special problems are caused by the proposal to underbuild the existing distribution line. Since, as contended by the applicant, the existing line will have to be upgraded eventually, the opportunity is provided to save construction costs and minimize the length of construction disturbance by combining the two lines. Also, the opportunity exists to combine two utility facilities on one set of poles in a single right-of-way, thus reducing the amount of new, separate right-of-way required for the proposed transmission line. These considerations tend to favor the applicant's preferred alternative route over all others.

The distribution line, besides continuing to serve existing customers along its length, must also serve the fresh water wells, slurry pump, and emergency dump sump pump of the proposed Mount Vernon Mine. Thus, if the proposed transmission line is to be underbuilt, little flexibility is possible in its location (see figure 2, page 21).

A further consideration is the effect of the availability of a 24.9-kV distribution line on residential growth in the Lake Creek Valley. This readily available power could encourage growth along the applicant's preferred route, particularly in the vicinity of Little Joe. This area is expected to undergo considerable growth as a result of the proposed Mount Vernon Mine development (USDA and Montana DSL 1978), and the siting of the line may well influence the location of residential growth areas.

A brief summary of impact risk for each concern will be given below, followed by a comparison of alternative routes based on this impact risk.

TABLE 5

COMPARISON OF ALTERNATIVE ROUTES

	Applicant's Preferred ^a	Applicant's Alternative ^b	DNRC Eastern Alternative ^c	DNRC Western Alternative ^d	DNRC Combination ^e
Approximate line length (km)	27.3	26.6	27.4	24.1	26.6
Length of possible underbuild replacing existing 12.47-kV distri- bution line (km)	16.6	15.8 ^f	9.79	7.0 ^h	12.2
Length of new access roads required (km)	2.7	.9	2.7	3.0	3.3
Length of new right-of-way clearing required (km)	5.8	11.3	5.8 ⁱ	13.5	10.5
Number of Lake Creek crossings	3	3	1	0	2
Number of small tributary stream crossings	8	5	6	4	7
Length of cultivated fields crossed (km)	1.4	.8	0	.9	1.4
Number of occupied residences within 0.3 km	46	31	60 ^j	7	30
Visual Impact:					
Potential impact on scenic views to recreation-related drivers (km) ^k	4.8	3.1	6.5	3.5	3.4
Potential impact on scenic views to mine-related drivers (km) ^k	6.0	4.1	6.0	2.8	6.0

Conversions: 1 km = .631 mi.

^aA-H-I-G-K-M-O-P-R-S-U-V-W.

^bA-H-I-G-K-L-N-P-R-S-U-V-W.

^cA-H-J-M-O-P-R-S-U-V-W.

^dA-B-D-E-F-L-N-S-U-V-W.

^eA-B-D-E-F-G-K-M-O-P-R-S-U-V-W.

^f11 km A to K; 3.1 km K to L; 1.7 km L to planned subdivision.

^gAn additional 4.3 km of possible telephone line northwest of Savage Lake is possible.

^hIncluding 1.7 km from L south to planned subdivision.

ⁱAssuming that the right-of-way of the abandoned Highway 56 may be used; if it may not, an additional 3.4 km of right-of-way clearing parallel to the existing highway will be required.

^jApproximately.

^kAs measured along routes on figure 7.

R. 34 W.

R. 33 W.

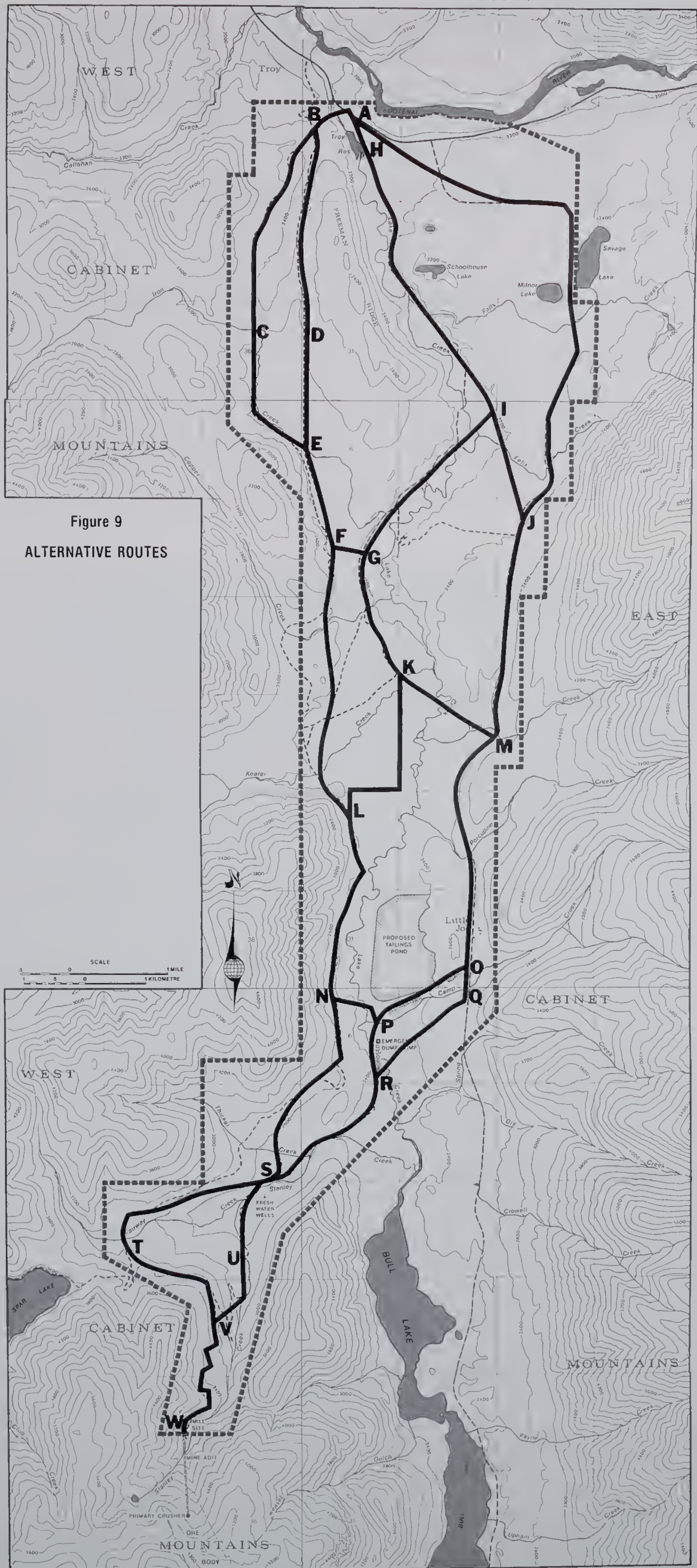


Figure 9

ALTERNATIVE ROUTES

T. 31 N.

T. 30 N.

T. 29 N.



POTENTIAL IMPACTS OF ALTERNATIVE SEGMENTS TO EACH CONCERN

Vegetation

In general, the additional amount of forest land which would be taken out of production is small for all alternative routes shown on figure 9, and the amount of right-of-way clearing necessary is variable but small. Clearing a 15-m (50-ft) right-of-way width over the 27-km (17-mi) length of line would result in a total of 0.42 km² (.16 mi²) or 42.09 ha (104 acres) of land devoted to the right-of-way. For those alternative sections which cross nonforested land or which follow roads either having a cleared right-of-way or paralleled by an existing cleared utility right-of-way, little additional clearing would be required. These include sections A-B-C-E, B-D-E, A-H-J, H-I-G-K-M-O-P, O-Q-R, and K-L. Alternative sections which do not follow utility rights-of-way or which follow narrow gravel roads not bordered by a cleared embankment would have to be cleared to the full nominal width (9-15 m or 30-50 ft). Route sections included in this category are portions of I-J, E-F-G, F-L-N-S-T-V-W, and R-S-U-V, all primarily located in the most highly productive habitat types of the area (western red cedar, western hemlock, and/or grand fir series) where forest land loss to rights-of-way is of greatest concern. Especially important in this respect are alternative segments F-L-N-S-U-V-W and S-T-V, which are almost entirely within the western red cedar/queencup beadrily or western hemlock/queencup beadrily habitat types, and which would require extensive right-of-way clearing over most of their length.

The applicant's preferred route, the A-H-J-M eastern alternative, and the A-B-D-E-F-G alternative pose the least impact risk to vegetation.

Socioeconomic Attributes

There are no major differences among the alternative routes with respect to the economic impacts of the proposed line. Since the bulk of the economic impact is associated with construction, the main difference between the routes would be due to differences in length and in the difficulty and cost of construction, and these differences are small. Similarly, the social impacts associated with the line are likely to be connected with the perceptions of individuals as to the overall desirability of the ASARCO project; any differences in the social impact of different routes would probably be due mainly to the frequency of viewing. As discussed on page 54, a line of this type tends to fade from attention with time.

The one major difference in impact related to economic and social factors among the alternate routes has to do with the social and economic cost of subdivision and the effect of the line on promoting or discouraging subdivision. If the distribution line were to be kept on its present route, there would be no change in the costs of developing parcels of land throughout the valley. Parcels close to existing utility lines can be built on and connected to utility service more cheaply than those distant from such a line. Construction along the applicant's preferred route has the minimum effect on the costs of subdivision in the valley. To the extent that the proposed line travels along a route not previously traversed by utility lines, it would provide a right-of-way and a set of utility poles on which distribution lines can be strung at relatively little expense. Accordingly, the costs of hooking up newly developed parcels of land in the areas newly served by the line would be

reduced, with the incentives for development correspondingly increased. It is difficult to assess the degree to which this change would actually affect the rate of development of the valley. There is a backlog of subdivided land in the valley which has not yet been developed, much of it within easy reach of utility lines. Land such as that recently subdivided along segment L-N would see lower costs of hooking up to utility service if either the applicant's alternate route or the DNRC western alternative were chosen than if any of the other routes were selected.

Aquatic Systems

Crossings of Lake Creek, which is considerably larger than the other streams in the study area and has a more valuable fishery, would require more care during construction than crossings of other streams to protect fisheries and to comply with laws that provide stream bed and bank protection. The applicant's preferred and alternative routes each cross Lake Creek three times; the other routes none, one, or two times (see table 5). Thus, the potential hazard to aquatic systems is higher on the applicant's preferred and alternative routes.

Considering the potential hazard to shorter segments of the various alternate routes in figure 9 is more difficult because, as discussed in chapter 4, none of the possible stream crossings pose exceptional environmental or engineering problems, and nowhere is the probable impact expected to be severe. Route segments west of Lake Creek cross fewer tributaries of Lake Creek than do route segments to the east, and therefore the potential hazard to aquatic systems is marginally less on the west.

Land Use

The cultivated fields on each of the alternative routes are shown on figure 5 on page 47. Route segments B-C-E, H-I, H-J (near and south of Savage and Milnor lakes and Felix Creek), M-O (near Little Joe), and G-K cross sizeable areas of cultivated land. The southern half of the study area has little cultivated land, particularly on the west side of the valley. This pattern may change slightly in coming years as scattered, small patches of cultivation are made in areas newly subdivided.

Segments A-H-I-G-K-M and A-H-J-M are roughly comparable in the amount of cultivated land crossed; B-C-E crosses considerably more than does B-D-E. Moreover, B-C-E is somewhat longer and thus more costly than is B-D-E and is clearly not as desirable a route. The same conclusion was reached in the visual impact analysis (page 71).

Sixteen residences would be approached within 0.3 km (0.2 mi) by route B-C-E, only six by B-D-E. Adoption of B-C-E would therefore lead to more potential land use impacts such as radio and TV interference, audible noise, and nuisance disruption of household activities. This difference is not significant because the bulk of these impacts can be well mitigated and because so few houses are involved. In fact, some of the occupants along the applicant's preferred route (which, along with H-J, passes near the greatest number of homes) may consider the line an overall benefit to them because it will

serve as a new, larger, and hence more reliable distribution line.

As shown on figure 6, the length of new construction access roads required gives a rough measure of the impact on access to recreational areas (such as for hunting and fishing). I-J, F-L, and S-T-V are the only segments which would require significant lengths of new road (note that the length of new right-of-way clearing is not the same).

Visual Concerns

Alternate route B-C-E follows an existing distribution line near a good paved county road along the west side of Iron Creek Valley. The views to the east from most of this road are of high quality, combining a midground scene of green hayfields, neatly-kept farm buildings, and grazing animals--a beautiful pastoral landscape--and a background scene of the low, forested Freeman Ridge backed by an open view of the rugged, snow-clad peaks of the Cabinet Mountains Wilderness. These are among the finest views from roads in the study area. In contrast, route B-D-E lies on the east side of Iron Creek Valley, where midground and background views are for the most part screened by trees, shrubs, and the nearby Freeman Ridge.

Route S-T-V leads due west from the mouth of Stanley Creek and follows a portion of the Spar Lake Road to within 1 km (0.6 mi) of Spar Lake before looping south and east to the proposed ASARCO plant and mine office site. The visual impact of the line, even if partially mitigated by screening it from view with trees, would be significant, because this road receives much warm-season traffic by persons visiting Spar Lake to camp, fish, hunt, and relax. A line would be visually out of place near this road. Route S-U-V, the alternate to S-T-V, would place the line in new clearcuts and thus in open view to traffic on the road to the ASARCO mine, plant and office. The ore-slurry pipeline would necessarily be located along route S-U-V (figure 1, page 9), and mine-related traffic would be the most common on the road. The quality of the views obtained along S-U-V would be degraded by the line, but not nearly as much as they would be along S-T-V; the visual expectation of the users would be different, and the visual quality of the route would already have been partially degraded by the pipeline and other mine-related construction along segment S-U-V.

The remaining alternate route segments differ less strongly in visual concerns, and are not here compared in detail. A good graphic description of their visual properties is given by figure 7.

Wildlife

None of the alternative routes in figure 9 pose the risk of significant adverse impact to the wildlife resource. An active osprey nest is approached within 1.0 km (0.6 mi) at one point along segment H-I, and another in association with a small heron rookery is approached within 2.0 km (1.2 mi) along segment Q-R. However, construction-related disturbance would be well screened from the nest sites by trees and would not be likely to cause nest desertion. Those sections which cross Lake Creek (H-I-G, K-M, O-P-N, and Q-R-S) would be likely to result in some waterfowl mortality due to wire strikes, especially since the line would have a 24.9-kV underbuild. This mortality would not be

likely to measurably affect the waterfowl carrying capacity.

Impacts to large mammals due to disturbance or habitat alteration would be negligible where alternative routes follow existing roads or existing utility rights-of-way.

The greatest risk for adverse wildlife impact exists where alternatives leave existing roads or rights-of-way and cross heavily forested lands; in these areas, new access roads can increase use of the land by humans and disturbance of ungulates, and right-of-way clearing would alter habitat. Such alternatives are I-J, F-L, O-P-R, and T-V. The USDA and Montana DSL (1978) baseline study of the area revealed no highly vulnerable concentrations of ungulates, critical habitats, or other major wildlife concerns in these areas. Use by humans of all areas except that along alternative T-V is already high, and little additional disturbance would be expected to result from line construction. The effects of canopy removal upon browse production and hence upon ungulates are uncertain but are not likely to significantly affect populations in this region of abundant cover and browse.

In the vicinity of the proposed Mount Vernon Mine, access road, and associated facilities (including the tailings pond), any impacts of the line upon wildlife would be eclipsed by the much greater impact of the former facilities, which are addressed in USDA and Montana DSL 1978 but not in this report. Even in the absence of mine-related impact, the wildlife impact risk of the proposed line in the mining project area is negligible.

All alternative routes are of small and similar impact risk to wildlife.

Substrate Suitability

Figure 8 shows that H-I-J is the only alternative segment passing through more than one area subject to slump hazard. S-U-V and, to a lesser degree, S-T-V and L-N-S cross steep mountain slopes that are possibly subject to the hazards of landslides and rapid soil creep. Alternative segments differ in length of new access roads required and thus in potential soil erosion hazard.

Notwithstanding these differences among alternate routes, substrate suitability in the study area is not considered a significant factor in locating the line and will not be considered further.

COMPARISON OF ALTERNATIVE ROUTES

On the basis of the preceeding discussion of potential impacts, five alternative routes have been selected by the DNRC as being the most feasible and having the least impact risk of all possible combinations of alternative segments. Segment B-C-E was omitted on the basis of visual impacts, I-J because of the amount of new right-of-way clearing required, S-T-V because of visual impact and the amount of new clearing required, and O-Q-R because it has no clear advantage over O-P-R, which is part of the applicant's preferred route. The five alternative routes are described below and compared in table 5.

Applicant's Preferred Route (A-H-I-G-K-M-O-P-R-S-U-V-W)

This route follows the right-of-way of the applicant's existing 12.47-kV distribution line to point O, then follows the proposed ASARCO access road to the proposed Mount Vernon Mine. It is within 0.1 mile of the longest alternative but provides for maximal use of existing rights-of-way.

The potential for impacts to owners of cropland and homes along this route is moderately high compared to the Department's western and combination routes and slightly higher than the applicant's alternative route (table 5). This impact could be mitigated by short reroutes. Likewise, the potential for impacts to aquatic resources is higher on this than on any of the four other routes; more streams are crossed, and Lake Creek, the largest stream in the study area, is crossed three times.

The visual impact of the existing distribution line is moderate with a few exceptions. Rebuilding the line with taller towers would make it more conspicuous in some places and less in others where the view from the road is under the line. As with impacts to cropland, short reroutes could probably eliminate the more obvious visual intrusions.

The major advantage of this route is that the existing line has already been incorporated into the expectations of viewers. Selection of an alternative route would not eliminate the line; rather, the line, and its impacts, would remain. Further, the opportunity would be lost for mitigating some of the more glaring intrusions, as mentioned above.

In summary, this route maximizes use of the existing transmission line and its right-of-way but does not significantly differ from the other routes with respect to impacts to landowners or the environment.

Applicant's Alternative Route (A-H-I-G-K-L-N-P-R-S-U-V-W)

This route is identical to the applicant's preferred route except between points K and P, where it follows a graveled road to the west of Lake Creek. It involves partial use of the existing Lake Creek 12.47-kV transmission line and its right-of-way.

It has average potential for impacts to land use, as compared with the other four alternative routes, in that it crosses a considerable amount of cropland and passes near many houses in its northern half (but nearly none in its southern half).

The route has average potential for impacts to aquatic systems.

One clear advantage this route has over the other four routes is in requiring the least length of new access roads. This route requires the second largest amount of new right-of-way clearing, exceeded only by the DNRC western alternative.

The major advantage of this route is in visual impact. By avoiding both the heavily traveled Bull River Highway and the mine access road, this route would result in only moderate visual impact to both recreational and mine-related traffic. The recreational traffic impact for this route is the lowest

of all routes, and mine-related traffic would have less visual impact only on the DNRC western alternative. This route also has the second lowest impact on cropland. It passes through the recently subdivided land in section 31 of T30N, R33W, thereby reducing the eventual cost of providing service to this subdivision, which may be perceived as a benefit by the owners and potential buyers of land in that subdivision and may also be a benefit to the applicant's system. By reducing the cost of developing the subdivision, this route could also increase the likelihood of its development and further subdivision by occasional sales, which may be perceived as a detrimental impact of this route by those who would prefer to avoid having the valley developed in a dispersed fashion.

DNRC Eastern Alternative Route (A-H-J-M-O-P-R-S-U-V-W)

This route follows an existing BPA transmission line right-of-way and a small road from the Troy Substation to Highway 56, which it follows to point M. From there south it is identical to the applicant's preferred route. Even though it takes advantage of the existing distribution line which runs north from the Chase Cutoff to serve housing developments near Savage and Milnor lakes, this route has nearly the least potential for underbuild of any route. If telephone rights-of-way northwest of Savage Lake and Highway 56 are used, then right-of-way clearing and potential underbuild are about the same as on the applicant's preferred route.

The eastern alternative passes close to far more residences than other routes--about 60, as compared to 7 to 46 for the others--but impact to cropped land is the lowest of all routes.

Potential impact to aquatic systems is average.

Considering its effect on spectacular views, as well as number of viewers on the route, this route has the highest impact on the visual experience of recreational drivers. Some visual impact, due to the existing distribution and telephone lines on this route, will remain even if another route is chosen. This route also contains 6.0 km (3.7 mi) of mine access road with spectacular views, for which the visual expectation of mine traffic must be considered.

In summary, the eastern route, except for crossing cropland, has no clear advantage over other routes and has relatively high potential for a number of types of impact.

DNRC Western Alternative Route (A-B-D-E-F-L-N-S-U-V-W)

This route proceeds southwest from the Troy Substation, following a St. Regis Paper Company hauling road to point F. It then proceeds south along forested slopes to the west of Lake Creek, generally following existing roads but also traversing small roadless tracts. From point S south it is identical to the other routes.

The chief advantage of the Department's western alternative is that it is the shortest route--24 km (15 mi) as opposed to 26-27 km (16-17 mi)--thus minimizing construction cost to the applicant. Cost savings would not be as

high as might be expected because south of Keeler Creek, on segment L-N, the route runs along a steep forested sideslope where construction would be more difficult than on the more level ground found on three of the other routes. (Segment L-N is also part of the applicant's alternative route.) Farther south, on the north part of segment N-S, the western alternative passes along another steep sideslope offering increased construction difficulties.

Because the western alternative passes close to far fewer occupied residences than any other route, it offers minimum potential impact for such land use considerations as radio interference, audible noise, and nuisance impacts to residences. It is only average in length of cropland crossed.

The potential hazard to aquatic systems is minimized on the western route--there are no crossings of Lake Creek and but four crossings of small tributaries; the other routes each have 7 to 11 stream crossings.

The visual impact for recreational traffic is higher on this route than on the applicant's alternative route (3.5 vs. 3.1 km or 2.2 vs. 1.9 mi) but the impact on mine-related viewing is the lowest of all (2.8 vs. 4.1 km or 1.7 vs. 2.6 mi for the next lowest).

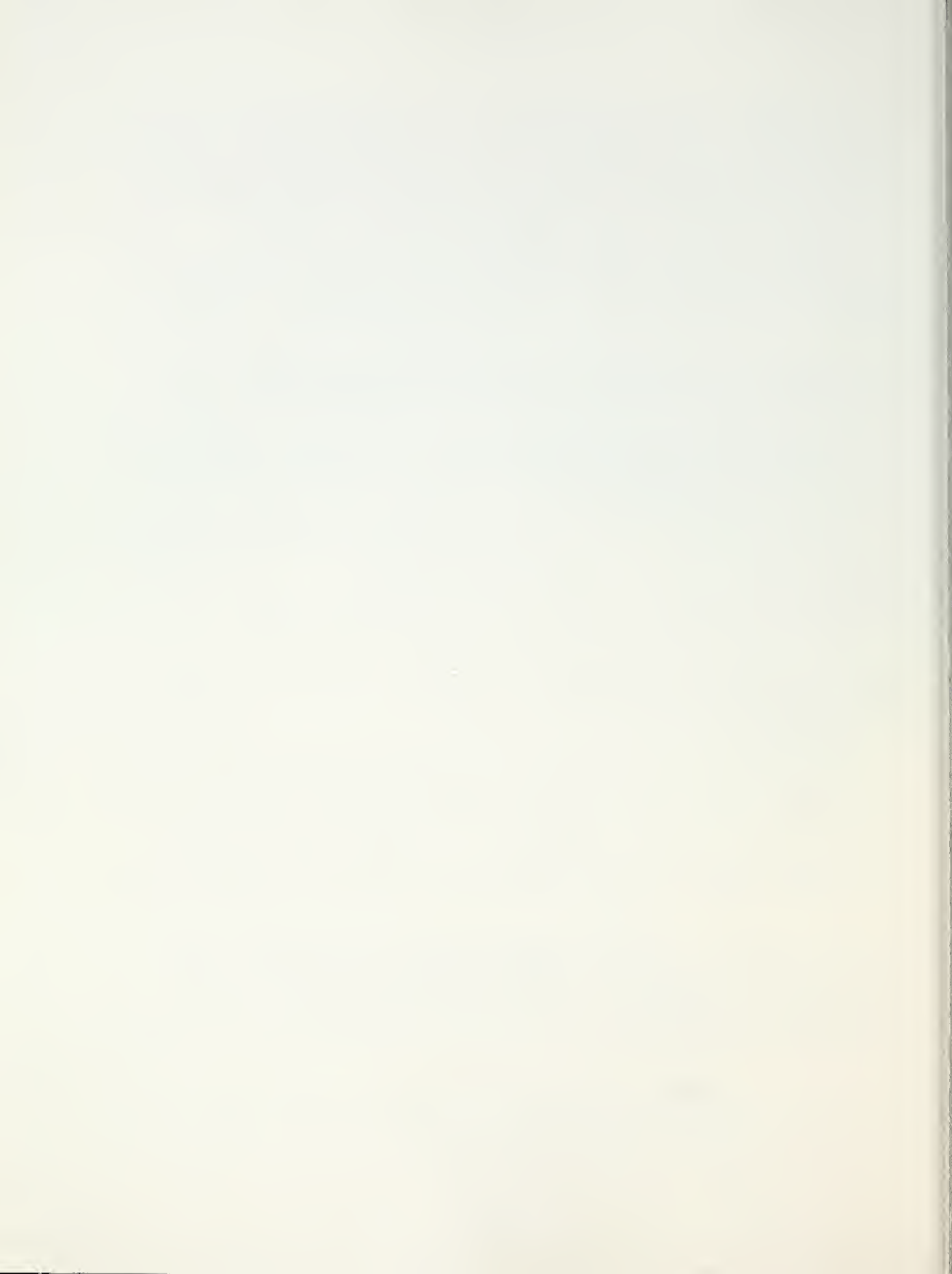
The route would require the greatest length of new right-of-way and would provide the least length of possible underbuild of existing transmission and distribution lines. These are significant disadvantages.

DNRC Combination Alternative Route (A-B-D-E-F-G-K-M-O-P-R-S-U-V-W)

This route is a combination of the DNRC western alternative, with which it is identical north of point F, and the applicant's preferred route, with which it is identical south of point G. The crossover is made near a paved road between points F and G.

This route has average visual impact. Considering interference with recreational views, it is comparable to the Department's western route and the applicant's alternate route. It allows use of a considerable amount of the existing distribution line right-of-way in Lake Creek Valley, as desired by the applicant. In contrast, the Department's western route has the least potential visual impact overall and makes use of existing distribution systems in Iron Creek Valley rather than following any of the Lake Creek Valley distribution system.

The combination route has a marginal advantage over the applicant's two routes in that it crosses Lake Creek only twice; it is similar to the applicant's alternative route in numbers of smaller stream crossings. Few cropped areas are crossed. In comparison with the applicant's routes and the Department's eastern route, this route closely passes the same number of or fewer residences.



CHAPTER SIX

SHORT-TERM AND LONG-TERM EFFECTS ON PRODUCTIVITY

There would be a long-term commitment of land to the proposed line. For example, some forested land would probably be taken out of production to accommodate access roads and the right-of-way. If further development continued to remove productive land from agricultural or forestry uses, this initial loss of productive land could represent the beginning of a much larger cumulative loss.

The effects of transmission lines on aesthetics are both immediate and long-term. While residents of the area may eventually become accustomed to the line's visual presence, their perception of the landscape would nevertheless be influenced because the line would detract from its scenic quality.

The proposed line would probably exist for as long as a need for electrical energy exists in the area, even beyond the projected 20-year life of the proposed Mount Vernon Mine if other ore bodies in the area were developed. The possible effects of increased power availability on future growth patterns in the Lake Creek Valley, while difficult to predict, deserve mention. Although the cause-and-effect relationship between growth and power availability is complex, it can be said that growth demands increased power availability. In constructing the proposed line and supplying projected future power needs, a commitment is made to allow increased population density, increased use of energy, and continued land use change in the valley. All of these would have significant long-term effects on the valley's environment.

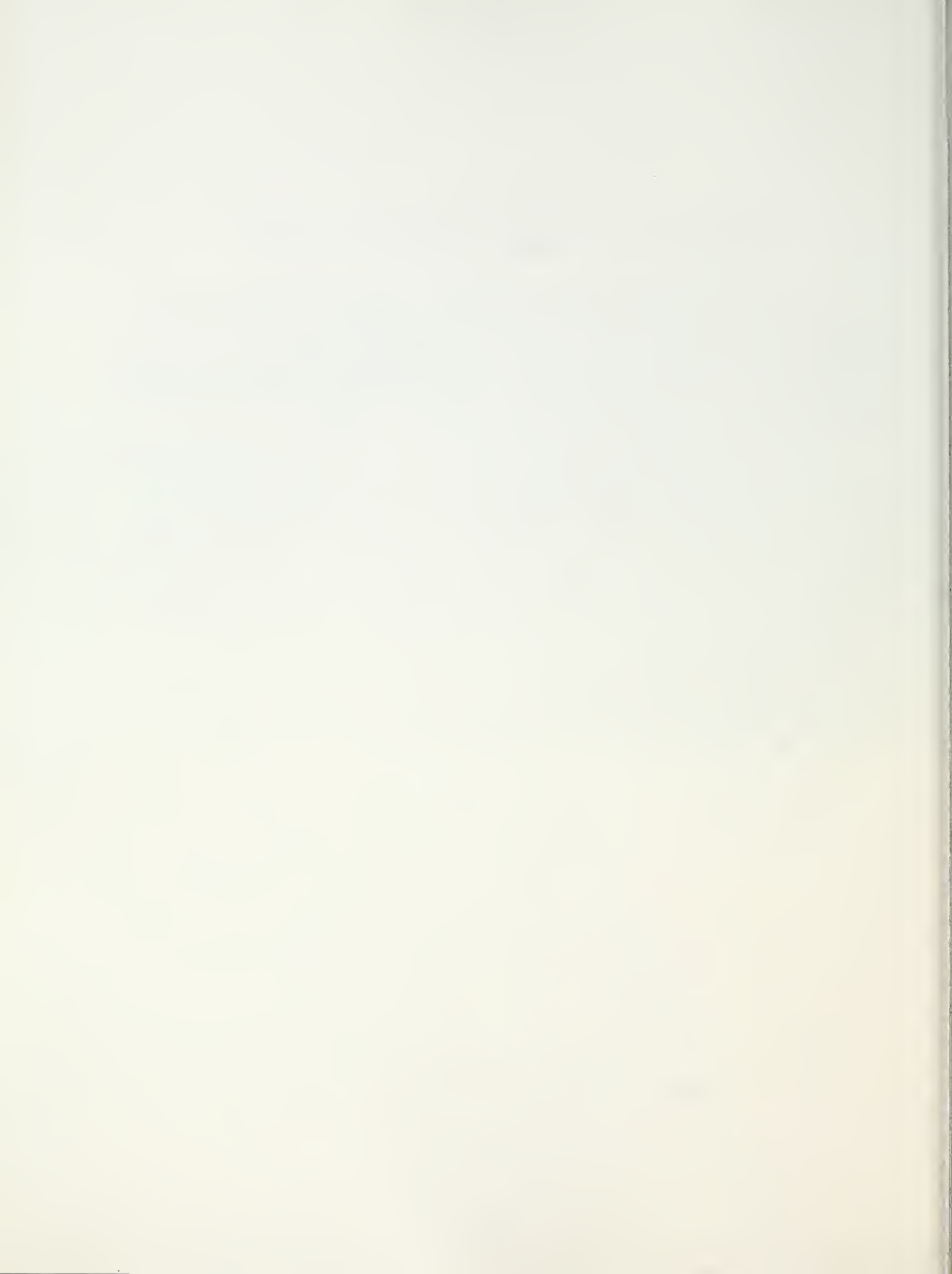
CHAPTER SEVEN

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

In theory, most of the resources directly involved in transmission line construction are retrievable, with the exception of energy consumed. In reality, only those materials of most value, primarily conductors, are usually reclaimed if the line is removed (which is considered unlikely--see chapter 6) or reconstructed. The remaining materials (e.g., poles, insulators, shipping crates) can be considered irretrievably committed, subject to future reuse and recycling policies, price of materials, and cost of recovery.

When a transmission line crosses productive agricultural land, some amount of the land productivity may be committed for the life of the line (or possibly beyond). The physical presence of the line may place restrictions on some agricultural practices (overhead irrigation, for example) which may be essential to maintain productivity. Complete loss of the use of agricultural land may occur because of the presence of poles or their support structures. Likewise, because right-of-way clearance would involve not only the removal of trees from an area of existing or future production of marketable timber but also the continued control of tree growth along the corridor, some amount of potential timber productivity can be considered irretrievably committed.

In conclusion, although there would be some irreversible and irretrievable commitment of resources to the proposed line as described above, the effect of such commitment on the environment would not be significant.



CHAPTER EIGHT

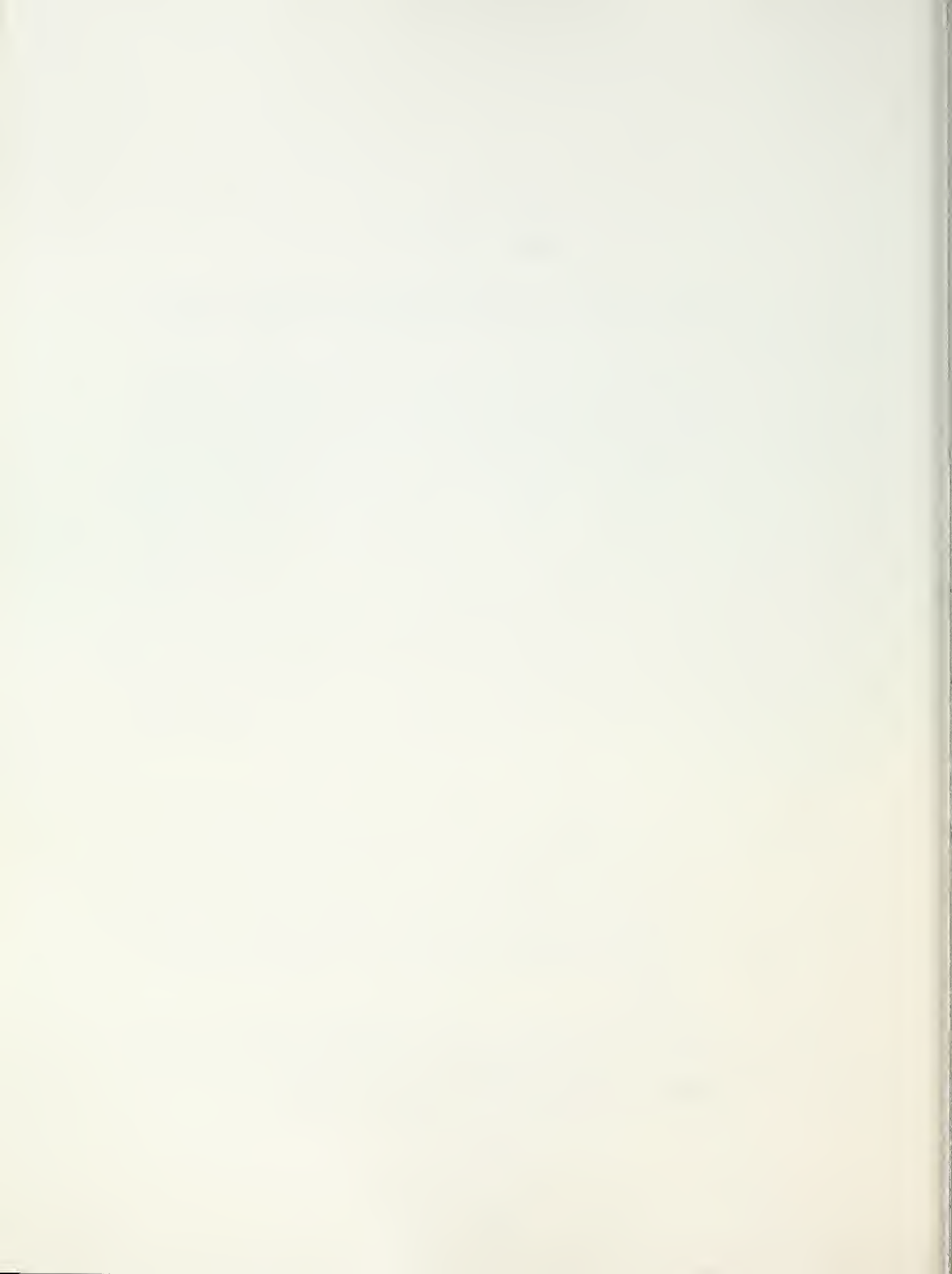
UNRESOLVED QUESTIONS

A number of issues alluded to throughout this impact statement remain unresolved, making difficult the assessment of the nature and size of the proposal's impacts.

One unresolved question involves the timing of the opening of the mine. The decision by ASARCO to commence construction and operation of the mine and concentrator will depend upon corporate evaluations of the metals market and the prospects for profitability; the decision by the applicant to construct the proposed line will depend upon ASARCO's decision. It is possible that, even if all relevant permits are granted, no construction might take place for several years. This has several disturbing implications. In the first place, the impact projections prepared by the U.S. Department of Agriculture and the Montana Department of State Lands (1978), as well as those contained in this impact statement, are based upon current knowledge. It is possible, perhaps even likely, that these documents will become obsolete with changing knowledge and changing conditions, and that different projections of environmental and social impacts, different mitigative measures, and possibly different recommendations, would be appropriate a year or two from now. In the second place, the impact upon the applicant's general membership of the construction of the line and the provision of service to ASARCO by the applicant depends upon whether power to serve ASARCO is provided by BPA or must be procured elsewhere (see page 42). As things stand now, this will depend on whether the load comes on line before July 1, 1982. This uncertainty should be resolved before any recommendation is made on whether the line should be constructed.

A second unresolved question is the desirability of underbuilding the existing distribution line and the extent to which the opportunity to upgrade the existing line is actually a benefit which may offset the incremental cost of underbuilding. It might be possible, given more information, to estimate the relative costs and benefits of underbuilding the line. If underbuilding were estimated to be undesirable, the argument for following the route of the existing distribution line would be weakened. However, since no other route appears to be significantly better, it might be desirable to follow the existing line anyway. In that case, not underbuilding would result in two lines within a wider cleared right-of-way.

Another unresolved question identified in this report (page 41) is the impact of the proposed arrangements for financing the line on the applicant's current membership, which will depend upon the rate structure for sale of electricity to ASARCO. These rates, according to the applicant, will be the subject of future negotiation between the applicant and ASARCO.



ACKNOWLEDGMENTS

Policy Guidance and Final Approval

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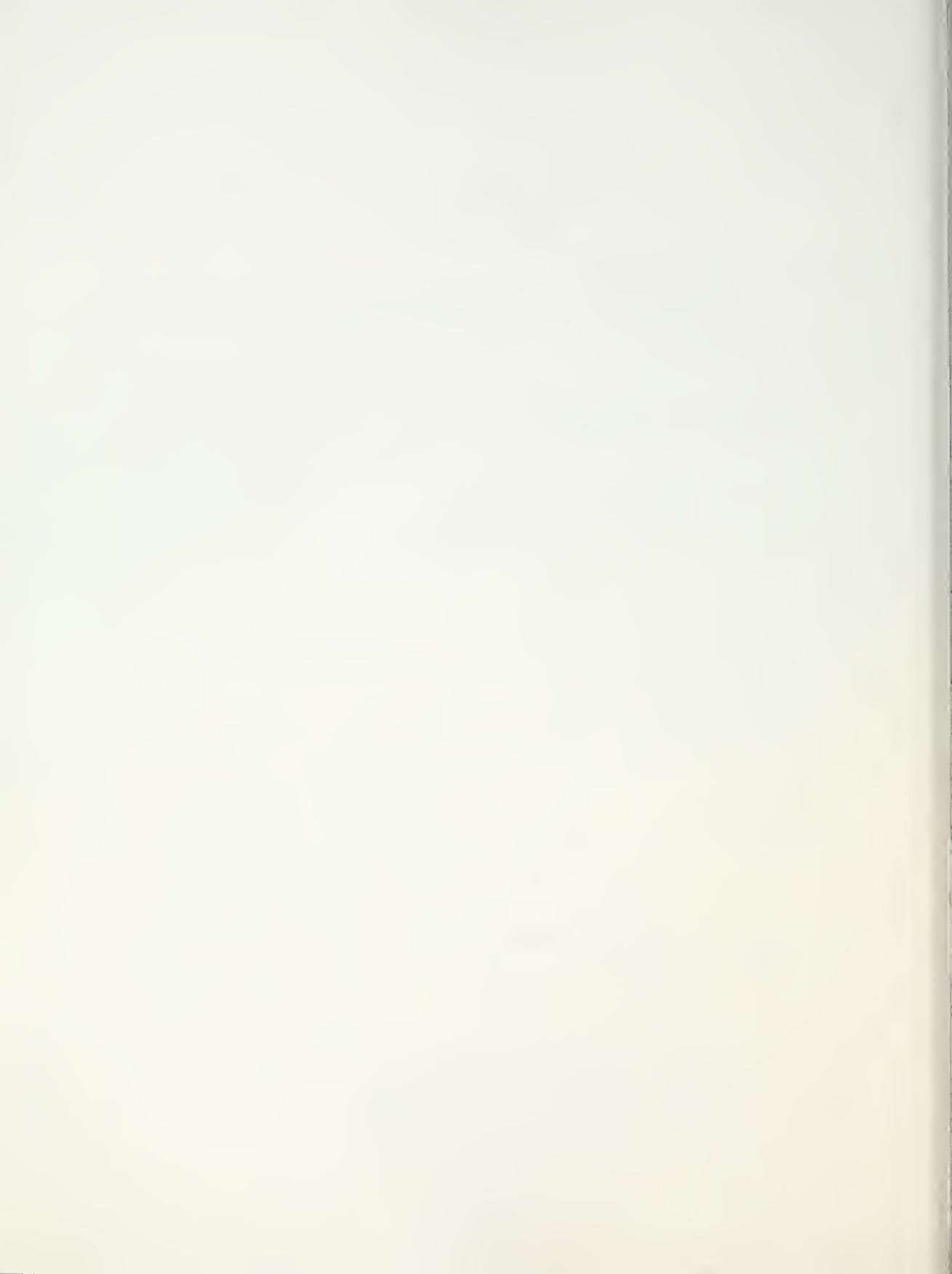
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James Sewell, James Sewell and Associates, Newport, WA.
John Westenberg, Lincoln County Planning Commission



APPENDIX A

TRANSMISSION LINE APPLICATION

SUBMITTED BY NORTHERN LIGHTS, INC.

RECEIVED

DEC 30 1977

NORTHERN LIGHTS, INC.
P. O. BOX 310
SANDPOINT, IDAHO

MONT. DEPT. OF NATURAL
RESOURCES & CONSERVATION

APPLICATION
TO
MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION
ENERGY PLANNING DIVISION
HELENA, MONTANA

FOR
ELECTRIC TRANSMISSION LINE
TO
PROPOSED MT. VERNON MINE

OF
ASARCO, INC.
BOX 440
WALLACE, IDAHO

PREPARED BY
JAMES A. SEWELL & ASSOCIATES
NEWPORT, WASHINGTON

DECEMBER 29, 1977

APPLICATION FOR ELECTRIC TRANSMISSION LINE

This application for Northern Lights, Inc. is for a 115 Kv transmission line with a 24.9 Kv underbuild part of its length. This transmission line will extend from the Bonneville Power Administration substation approximately one mile east of Troy, Montana southerly along Northern Lights' existing distribution line right of way to the proposed access road to the proposed Mt. Vernon mine and thence generally along said access road to the mine, a total distance of approximately 18 miles.

ASARCO has made studies of the general area through which the transmission line passes and has filed the studies with the State Department of Lands in connection with their application for the proposed mine. These studies are listed later in this application.

This transmission facility is required to provide the power for the operation of the proposed mine and mill since it is not economically feasible to provide at-site generation and it is felt that this proposal will have less environmental impact on the area than at-site generation.

This 115 Kv transmission facility is planned to be located on the Northern Lights existing right of way and thus will provide far less environmental impact than if a new line was constructed. This will be accomplished by re-constructing the new line with single pole structures wherever possible with the 115 Kv circuit on the top of the pole and the 24.9 Kv underbuild circuit located below to provide service to existing customers. Therefore, in considering the environmental factors involved, this location was believed to be highly superior to a new route for the transmission line.

The following information is submitted as required under the Energy Planning Division rules and regulations, paragraph 36-2.8(2)-S830 and are numbered in accordance with paragraph (1) thereof.

(a) The transmission of electricity is required from the BPA Substation at Troy to serve a load of approximately 18 megawatts at the ASARCO Incorporated's proposed mine and concentrator complex south of Troy, Montana. A detailed description of the ASARCO facility known as the Troy Project has been previously submitted to DNR and is entitled "Troy Project Operating Plan" dated May 14, 1976. This block of power is necessary for the mine and the process which includes size reduction of mineral bearing rock and the physical concentration of the minerals. This concentration of the ore saves the energy necessary to transport large quantities of mineral bearing rock to another locale where it would still have to be reduced prior to smelting. Instead, only the concentrate is trucked to Troy for rail shipment to the smelter.

This transmission line will be designed, constructed, and owned by Northern Lights, Inc. with ASARCO advancing funds for the construction which will be credited against the purchase cost of the power used by them through the life of the project. The size of the load was determined in the economic feasibility of the mine and mill. This requires a certain size mill to make an economical operation of the project.

Transmission load flow studies were made by BPA and the results are shown in Exhibit 10.

(b) Transmission of electricity is the only practical source of power of this magnitude. Diesel generation of power on site was investigated; however, the generation cost was prohibitive, the supply could be disrupted through oil embargo, and the U. S. balance of payments might be adversely affected.

Purchase of a used 25 megawatt diesel generator was found to give a cost per kilowatt-hour of about \$0.04 opposed to somewhat cheaper costs from Northern Lights. The diesel exhaust would be emitted into the atmosphere having an environmental impact and a discharge permit for this exhaust would be necessary.

115 Kv transmission was chosen because it is economically justified by lower line losses, and similar construction cost due to industry standardization.

A loop line to increase reliability is not feasible as it would more than double the line costs. In addition, feed to this area from a different source would entail a transmission corridor approximately 28 miles in length.

(c) The upgrading of the existing rural line will more than double the present capacity (12.47C Kv to 24.9 Kv). With an estimated 6.5% increase in load annually, this line, when upgraded, will serve the anticipated loads for the next 44 years. The 115 Kv circuit for ASARCO service will not have to be upgraded and will require only normal maintenance for the ± 20 years operating life of the mine.

The estimated connected load for the ASARCO project is 18,525 Kva. The estimated demand is 14,084 Kva.

(d) The existing 12.470 Kv line will be upgraded to 24.9 Kv although at this time demand does not require the improvement. This will eliminate the need to upgrade at a later date as demand increases. Replacement of the old line will provide more reliable service to existing customers. The existing line is old and the ASARCO project only accelerates the inevitable replacement of the existing distribution line.

(e) The preferred transmission corridor follows an existing line to State Highway #202 and then along this highway to the point at which the new road to the mine leaves the highway, and then follows generally along the new road as shown on the attached maps. (Exh. 1).

This routing of the line seems advisable since it has the minimum impact on the environment. The entire area is generally mountainous and to follow a route that was not along existing roads would make it very costly to construct and maintain as well as disturbing the environment to a much higher degree.

(i) The social impact of this transmission line will be the providing of better service to all of the existing customers as well as providing for the area growth.

(ii) Northern Lights, Inc. will pay taxes on this line as on their other facilities in Montana. Some local income will be generated by the hiring

of about 10 local people to aid in the construction, which will last 4-6 months. Governmental income will increase slightly because of the increased personal income of the construction work force. There will be no increased governmental spending in education, welfare, roads, medical care, law enforcement, or other services because of this line.

Economic factors involved in the construction of this line are:

1. Construction and operating costs. Total estimated cost of this transmission line is \$1,068,031.08. This cost amounts to \$67,069.00 per mile for the existing section and \$62,382.00 per mile for the portion to the water wells. The portion from the wells to the substation, which is a single circuit 115 Kv only is \$46,364.00 per mile. These figures are based on cost estimates shown in Exhibit 2.

2. Northern Lights, Inc. will pay annual taxes on this line of approximately \$12,576.00 for this facility. A filing fee of \$20,680.31 accompanies this application.

3. Some local income will be generated by the hiring of about 10 local people to aid in construction of this line, with about 20 persons coming into the area to supervise the construction.

4. Governmental income will be increased slightly because of the increased personal income of the above individuals.

5. There will not be any increased governmental spending in education, welfare, roads, medical care, law enforcement, or other services because of this line.

(iii) The following reports have been made available to your department through the Department of State Lands (Ralph Driear) which has been appointed the State's lead agency for preparation of an EIS on ASARCO's proposed mine known as the Troy Project.

1. Environmental Baseline information of the Mount Vernon Region by Stearns-Roger Corporation dated 1-31-75.
2. Troy Project Operating Plan dated 5-14-76.
3. Relation between Troy Project and the hydrology of the vicinity, Lincoln County, Montana by Water Development Corporation dated 12-13-76.
4. Troy Project Mining and Reclamation Plan dated 12-13-76.
5. The Department of State Lands (contact Ralph Driear) can also supply recent studies being carried out by various State agencies and outside contractors, which further describe the environment.
6. The Department of Natural Resources and Conservation has conducted an environmental analysis of the transmission line impact under our contract with the Montana Department of State Lands.

These studies were submitted to the above described agencies and this submittal serves as proof of service to these two agencies.

(iv) There is basically no effect on the cultural environmental factors in this area as the line either follows the existing location or is along the new road right of way except for a short distance near the mine. The topography is steep with wooded hillsides which have no real recreational, agricultural or industrial uses.

(f) Drawing and map included as follows:

(i) The preferred and alternate route of the transmission corridor is shown on Exhibit I which is the overall map of the area consisting of two sheets.

(ii) Drawings of preferred and alternative architectural designs for facilities such as electric transmission structures, aqueducts, substations and pump stations shall be submitted.

Exhibits 3 through 9, Drawings of transmission line structures. Note that Th-3A, 4A, 5A and TS-115 will be used only as necessary. These are angle structures and their use will be minimized.

(g) Description of engineering design specifications or criteria as follows:

(i) For electric transmission lines:

- (aa) Conductors by material type, cross section, midspan ground clearance, spacing between phases, etc.:
Conductor: Transmission 3-4/0 ACSR, 0.563 inch diameter, 25 foot minimum midspan ground clearance or 9'-0" above underbuild, phase spacing at poled 6'-10 $\frac{1}{4}$ ".
Underbuild 24.9 Grd. wye/14.4Kv 3-4/0 ACSR and 1-1/0 ACSR 0.563 inch diam. and 0.398 inch diam. 22 foot minimum midspan ground clearance, phase spacing at poles 3'-6 $\frac{1}{2}$ ".
- (ab) Lightning protection system:
Lightning protection is not considered necessary in this area.
- (ac) Insulators by size, material:
Insulators used are of five types and three materials.
 - a. The most common are porcelain insulators of which there are three types.
 - 1. 10" disc suspension insulators (Transmission).
 - 2. Pin type insulators (underbuild).
 - 3. Line post insulators (Transmission).
 - b. The second material and fourth type is combination of fiberglass member and an ethylene propylene copolymer which forms a horizontal post insulator.
 - c. The third material and fifth type insulator is a fiberglass rod used as a crossarm to eliminate some 10" disc insulators.
- (ad) Thermal capacity and rating:
The thermal capacity of this line is 340 amperes which gives a maximum capacity of 67.7 Mva at 115 Kv and 14.7 Mva at 24.9 Kv.
- (ae) Power losses as percentage of load and Kva rating:
The maximum losses at .92 power factor will be 2.75 percent.

- (af) Physical reliability of line due to geographic location and condition:
The reliability of this line should be excellent as it is mostly in the presently existing right of way and along the highway.
- (ag) Substations:
There will be a new switching structure in the existing Bonneville Power Administration's Troy substation and a new substation with two 12/15 MVA 115 to 4.16 Kv transformers at the Mt. Vernon Mine.
- (ah) Planned operational voltage:
The planned operating voltages for this line are 115 Kv Troy to Mt. Vernon Mine and 12470 Volts Troy to the well location.
- (ai) Critical voltage:
The critical line voltage will be the transmission or 115 Kv portion. The critical voltage gradient has not been calculated. The texts and other data we have found infer that there is no problem below 230 Kv.
- (aj) Radio and Television Interference Problems:
1. All power lines from low voltage to high voltage have presented problems in the field of radio and television interference. There will probably be an increase in this interference because of the higher voltage class of this line. We feel, however, that with proper maintenance and construction procedures, all of the effects of this increase can be minimized.
It is possible that some antennas may need to be moved because of the rebuilt line. The advantage of increased reliability of service far outweighs the chance of increased radio noise. The widening of the right of way will also help reduce interference because tree limbs will not be likely to strike the line.
- (ak) Historical outage data.
Outages on this section of line January 1973 through November 1977 are summarized below:

No. Outages	Cause	Consumers Affected		Duration in hours
		Rural Res.	Seasonal	
7	Tree	7 to 86 Ave. 64	0 - 40 Ave 4	1-9½
2	Tree-wind	71 & 71	0	3 & 7
2	Wind	86 & 86	0 & 47	3½ & 5½
1	Snow	71	0	5
1	Broken Insulator	71	40	2
1	Flood	71	40	5½
1	Rotten Pole	71	0	3½

There should be fewer tree caused outages with the rebuilt line because of the wider rights-of-way.

(h) Construction analysis, as follows;

- (i) This line will be installed by a qualified contractor, and inspected by Northern Lights, Inc. or their authorized agent. Northern Lights will not have control of the size and variation in size of the contractor's crews but will have a time limit on the construction of the contract.
- (ii) The contractor will probably erect all of the structures and then string the conductors on these structures for the new construction. The portion built along the existing line will be constructed in sections as it is necessary to keep outages to existing customers at a minimum. It is expected the maximum line outages will be 4 hours and the line will have to be returned to service at night. These outages can be held to a minimum by energizing the line from the Noxon end during construction. The construction starting date is contingent upon ASARCO obtaining all the necessary operating permits for the Troy Project and their decision to proceed to develop the mine-mill complex.
- (iii) It is anticipated that the contractor will use cranes or boom trucks to erect the poles. However, if any hillsides are too steep, the erection may be done by hand.
- (iv) The area under the line is presently natural grass and shrubs which will be allowed to continue to grow but the area must necessarily be kept free of trees.
 - 1. The width of right of way for the existing line kept clear of trees is 20 feet. The necessary width for 115 Kv horizontal post structures is 30 feet. The width necessary for two pole structures is 50 feet.
 - 2. There are no new roads presently planned or expected to be necessary for line construction. The roads built for mine access will be used for construction roads. If any new roads are necessary, they will be returned to their natural state and replanted after completion of construction.

All communications concerning this application shall be sent to James A. Sewell and Associates, Attn: James A. Sewell, Engineer, P. O. Box 160, Newport, Washington 99156, telephone 509/447-3626, with copies to Northern Lights, Inc., P. O. Box 310, Sandpoint, Idaho 83864.

Proof of service to municipalities, government agencies and populace in general are shown in Exhibits 11 and 12.

NORTHERN LIGHTS, INC.

By 
William T. Nordeen, Manager

December 29, 1977

EXHIBIT 2

Transmission Line Cost Estimate

1. 10.35 miles with all tangent structures		
type TPF-2 @ 56,816.00/mile	\$588,045.60	
less 52 structures @ 3,787.73 each	<u>(196,961.96)</u>	\$391,083.64
42 TPF-3 @ 5575.94	\$234,189.48	
8 TPF-4 @ 6490.10	51,920.80	
2 TS-115 @ 8486.00	<u>16,972.00</u>	\$303,082.28
3.6 miles new line w/ub @ 52363	\$188,506.80	
less 18 structures @ 3490.87	<u>(62,835.66)</u>	\$125,671.14
14 TPF-3 @ 5233.70	\$ 73,271.18	
3 TPF-4 @ 6180.50	18,541.50	
1 TS-115 @ 7089.20	<u>7,089.20</u>	\$ 98,902.50
Remainder without underbuild is about 1/2 angles as the terrain is rough.		
3.22 miles new line w/out ub		
@ 39,602	\$127,518.44	
less 18 str. @ 3,300.17	<u>(59,403.06)</u>	\$ 68,115.38
plus 16 TPF-3 or -4 @ 4338.98	69,423.68	
plus 2 TS-115 @ 5876.23	<u>11,752.46</u>	\$ 81,176.14
TOTAL COST		\$1,068.031.08

EXHIBIT 2

Structure Cost

TPF2

	Along Exist.Line 15/mi. 60' c1.2	Along New Road 15/mi. 60' c1.2	Along new road w/out underbuild 12/mi. 65' c1.2
Survey	2,826	2,826	2,826
Design	1,100	1,100	1,100
Poles	5,414	5,414	6,190
Insulation & Hardware	8,532	8,532	6,826
Conductor	<u>4,144</u>	<u>4,144</u>	<u>4,144</u>
Total Material	\$22,016	\$22,016	\$21,086
Construction			
Poles	4,320	2,700	2,448
Structure	3,780	2,430	1,944
Stringing	2,520	2,240	2,016
Guys & Anchors	1,440	1,200	1,152
Inspection	<u>1,320</u>	<u>1,100</u>	<u>1,056</u>
Total Labor	\$13,380	\$ 9,670	\$ 8,616
Underbuild	8,650	8,650	
Right of way	<u>3,300</u>	<u>3,300</u>	<u>3,300</u>
	\$47,346	\$43,636	\$33,002
Administration	<u>9,470</u>	<u>8,727</u>	<u>6,600</u>
Total/mile	\$56,816	\$52,363	\$39,602
Total/structure	\$ 3,787.73	\$ 3,490.87	\$ 3,300.17

EXHIBIT 2

Structure Cost

TPF-3

	Existing Line 1-70' cl. 2	New Line	TPF-3 & TPF-4 without underbuild 70' cl.2
Survey	192.50	192.50	192.50
Design	110.00	110.00	110.00
Poles	667.20	667.20	667.20
Insulators & Hardware	725.32	725.32	559.72
Conductor	<u>274.40</u>	<u>274.40</u>	<u>274.40</u>
Total Material	\$1,969.42	\$1,969.42	\$1,803.82
Construction			
Poles	355.20	222.00	222.00
Structure	318.00	222.00	222.00
Stringing	224.00	168.00	168.00
Guys & Anchors	540.00	540.00	540.00
Inspection	<u>440.00</u>	<u>440.00</u>	<u>440.00</u>
Total Labor	\$1,877.20	\$1,592.00	\$1,592.00
Underbuild	580.00	580.00	
Right of way	<u>220.00</u>	<u>220.00</u>	<u>220.00</u>
	\$4,646.62	\$4,361.42	\$3,615.82
Administration	<u>\$ 929.32</u>	<u>872.28</u>	<u>723.16</u>
Cost of each	\$5,575.94	\$5,233.70	\$4,338.98

EXHIBIT 2

Structure Cost

	TPF-4		TS-115	
	Along Ex.Line + 85' Class 2	Along New Line 85' Class 2	Along Ex.Line 85' Class 2	Along New Line 85' Class 2
Survey	192.50	275.00	192.50	275.00
Design	110.00	137.50	110.00	137.50
Poles	990.00	990.00	990.00	990.00
Insulators & Hardware	845.52	845.52	1,129.97	1,129.97
Conductor	<u>274.40</u>	<u>274.40</u>	<u>291.20</u>	<u>291.20</u>
Total Material	\$2,412.42	\$2,522.42	\$2,713.67	\$2,823.67
Construction				
Poles	660.00	432.00	660.00	432.00
Structure	276.00	192.00	450.00	300.00
Stringing	280.00	224.00	504.00	392.00
Guys & Anchors	540.00	540.00	1,080.00	1,080.00
Inspection	<u>440.00</u>	<u>440.00</u>	<u>660.00</u>	<u>660.00</u>
Total Labor	\$2,196.00	\$1,828.00	\$3,354.00	\$2,864.00
Underbuild	580.00	580.00	784.00	
Right of Way	220.00	220.00	220.00	220.00
	<u>\$5,408.42</u>	<u>\$5,150.42</u>	<u>\$7,071.67</u>	<u>\$5,907.67</u>
Administration	<u>1,081.68</u>	1,030.08	1,414.33	1,181.53
Cost per Struct.	\$6,490.10	\$6,180.50	\$8,486.00	\$7,089.20

EXHIBIT 2

Structure Cost

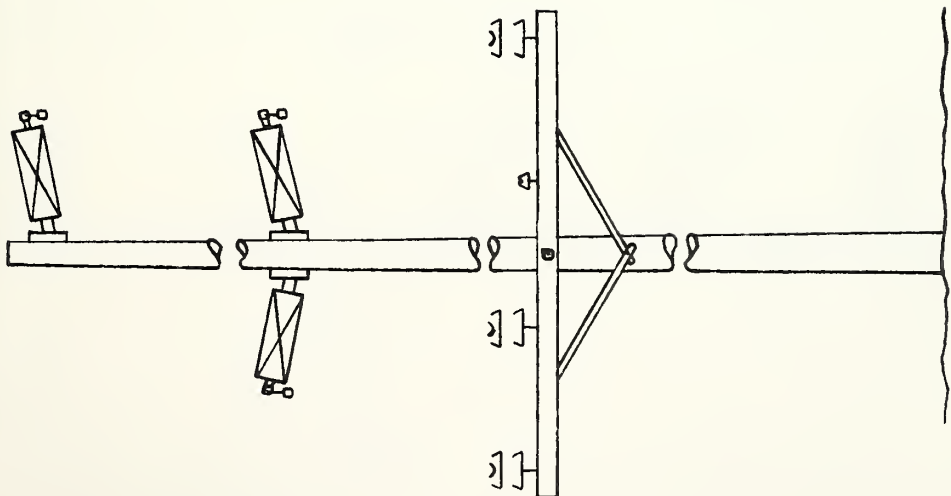
	TS-115 <u>Without Underbuild</u>
Survey	275.00
Design	137.50
Pole	667.20
Insulators & Hardware	651.96
Conductor	<u>291.20</u>
Total Material	\$2,022.86
Construction	
Pole	222.00
Structure	300.00
Stringing	392.00
Guys & Anchors	1,080.00
Inspection	<u>660.00</u>
Total Labor	\$2,654.00
Right of Way	<u>220.00</u>
	\$4,896.86
Administration	<u>979.37</u>
Total Str. Cost	\$5,876.23

EXHIBIT 2

Single Structure Cost

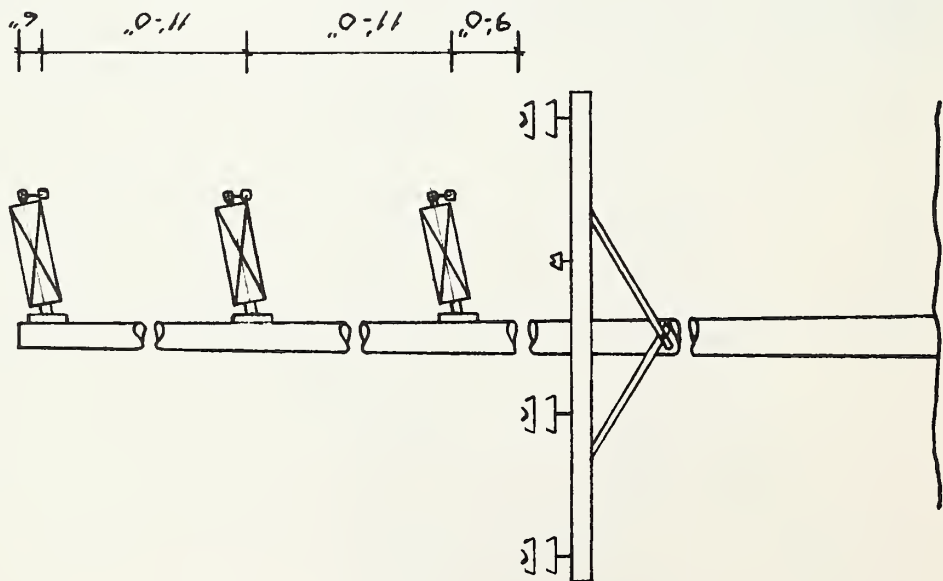
	TH5-A 1-Ø wire/1pole 60' cl.2	TH3-A 60' cl.2	TH4-A 60' cl.2
Survey	\$ 550.00	\$ 550.00	\$ 550.00
Design	220.00	220.00	220.00
Poles	1,082.88	1,082.88	1,082.88
Insulators & Hardware	1,848.79	689.60	626.60
Conductor	<u>336.00</u>	<u>291.20</u>	<u>291.20</u>
Total Material	\$4,037.67	\$2,833.68	\$2,770.68
Construction			
Poles	864.00	864.00	864.00
Structure	1,020.00	690.00	660.00
Stringing	560.00	280.00	280.00
Guys & Anchors	540.00	540.00	540.00
Inspection	<u>660.00</u>	<u>550.00</u>	<u>550.00</u>
Total Labor	\$3,644.00	\$2,924.00	\$2,894.00
Underbuild	580.00	522.00	522.00
Right of Way	<u>275.00</u>	<u>275.00</u>	<u>275.00</u>
	\$8,536.67	\$6,554.68	\$6,461.68
Administration	<u>1,707.33</u>	<u>1,310.94</u>	<u>1,292.34</u>
Total	\$10,244.00	\$7,865.62	\$7,754.02

.6 .0;11 .0;6



TRANSMISSION LINE TANGENT STRUCTURE
 115 KV. W/ 24.9 KV. UNDERBUILD
 FIBERGLASS HORIZONTAL LINE POST

DATE: 5-19-76
 TPF-2

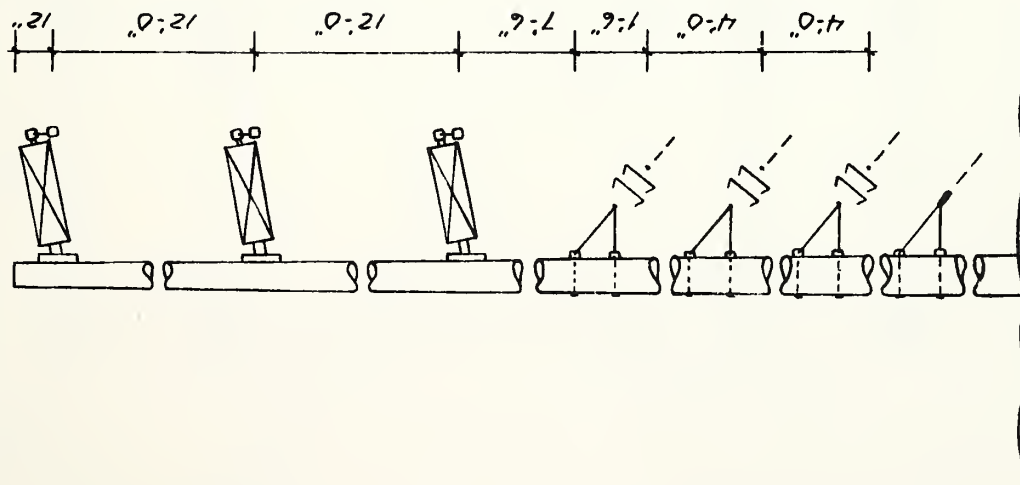


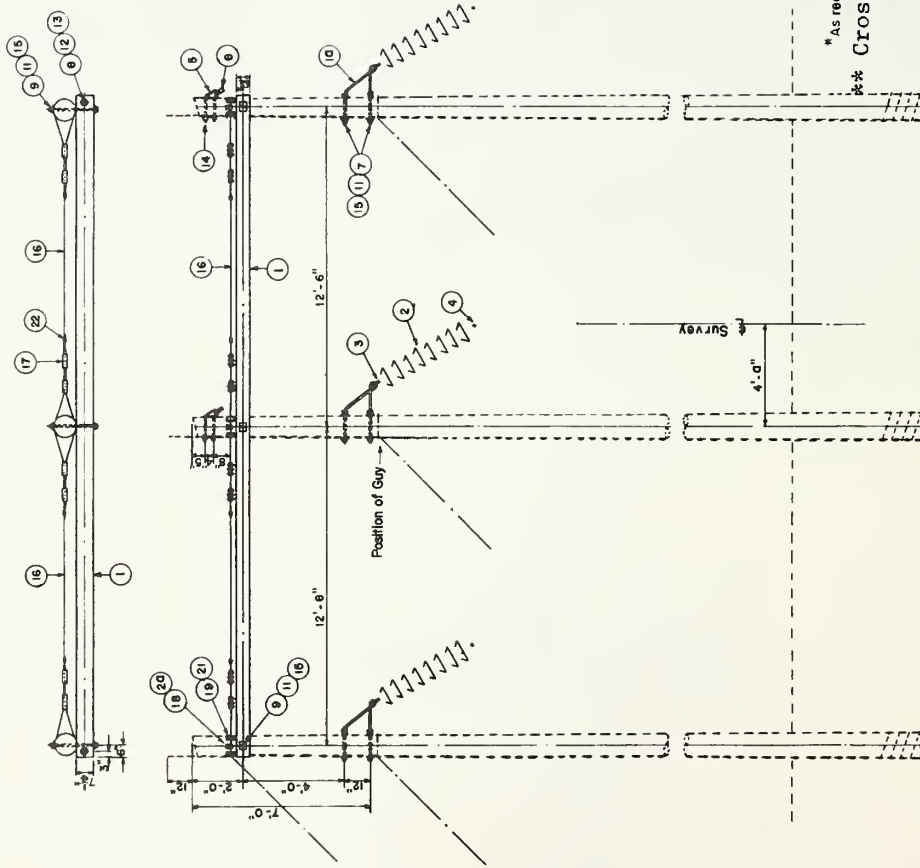
TRANSMISSION LINE SMALL ANGLE STRUCTURE
 115 KV. W/24.9 KV. UNDERBUILD
 FIBERGLASS HORIZONTAL LINE POST 0-25°

DATE: 5-19-76
 TPF -3

TRANSMISSION LINE LARGE ANGLE STRUCTURE
 115 KV. W/ 24.9 KV. UNDERBUILD
 FIBREGLASS HORIZONTAL POST 25°-60°

DATE: 5-19-76
 TPF -4





* As required See Drg. TM-1
** Crossarm type 55

LIST OF MATERIAL

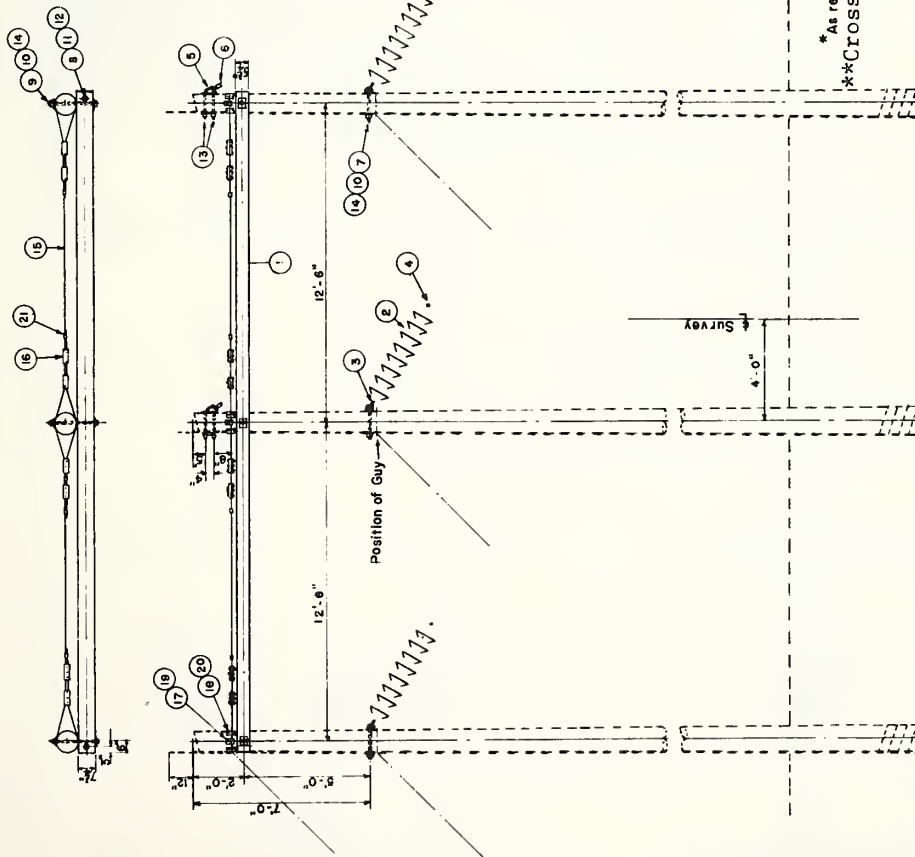
DRG REF	REQD	DESCRIPTION	ITEM
1	1	5 1/2" x 7 1/2" x 26'-0" Wood Crossarm **	g
2	2	5 3/4" x 10" Suspension Insulator	k
3	3	Suspension Hook	eh
4	3	Suspension Clamp and Connecting Piece	ei
5	2	Ground Wire Cable Support	ed
6	2	Ground Wire Suspension Clamp	m
7	6	3/4" x 14" Clevis Bolt	ef
8	2	1/2" x 8" Machine Bolt	c
9	3	3/4" x 20" Machine Bolt	c
10	3	3/4" Angle Bracket	cr
11	18	4" x 4" x 3/16" Galv. Sq. Washer, 13/16" Hole	d
12	4	1 3/8" Galv. Round Washer, 9/16" Hole	d
13	2	Locknuts for 1/2" Bolt	ek
14	4	Locknuts for 5/8" Bolt	ek
15	9	Locknuts for 3/4" Bolt	ek
16	50'	Guy Wire	y
17	8	3 Bolt Guy Clamp - 6" Long	u
18	6	Guy Hook	bj
19	6	Guy Plate	bk
20	6	1/2" x 4" Lag Screw	j
21	3/16"	6d Copperweld Nails	bp
22	4	Guy Clip	dz

TRANSMISSION LINE MEDIUM ANGLE STRUCTURE
 — KV. H- FRAME SUSPENSION- THREE POLE
 115 KV. MAXIMUM - 12'-6" POLE SPACING

Scale: 1/4"=1'-0"	Date: 11-49
TH-3A	

NOTE
 Note one turn of downlead underneath washers around conductor support bolts.

1	Released	8-56
No.	REVISION	Date.



* As required See Drg. TM-1
 ** Crossarm type 55

LIST OF MATERIAL

DRG REF.	REQD	DESCRIPTION	ITEM
1	1	5 3/4" x 1 1/4" x 26'-0" Wood Crossarm **	g
2	*	5 3/4" x 10" Suspension Insulator	k
3	3	Suspension Hook	eh
4	3	Suspension Clamp and Connecting Piece	ei
5	2	Ground Wire Cable Support	ed
6	2	Ground Wire Suspension Clamp	m
7	3	3/4" x 1 1/4" Eye Bolt	o
8	2	1/2" x 8" Machine Bolt	c
9	3	3/4" x 20" Machine Bolt	c
10	12	4" x 4" x 3/16" Galv. Sq. Washer, 13/16" Hole	d
11	4	1 3/8" Galv. Round Washer, 9/16" Hole	d
12	2	Locknuts for 1/2" Bolt	ek
13	4	Locknuts for 5/8" Bolt	ek
14	6	Locknuts for 3/4" Bolt	ek
15	46	Guy Wire	y
16	8	3 Bolt Guy Clamp-6" Long	y
17	6	Guy Hook	bj
18	6	Guy Plate	bk
19	6	1/2" x 4" Lag Screw	j
20	3/16	6 d Copperweld Nails	bp
21	4	Guy Clip	dz

TRANSMISSION LINE LARGE ANGLE STRUCTURE
 ——— KV. H-FRAME SUSPENSION-THREE POLE
 115 KV. MAXIMUM - 12'-6" POLE SPACING

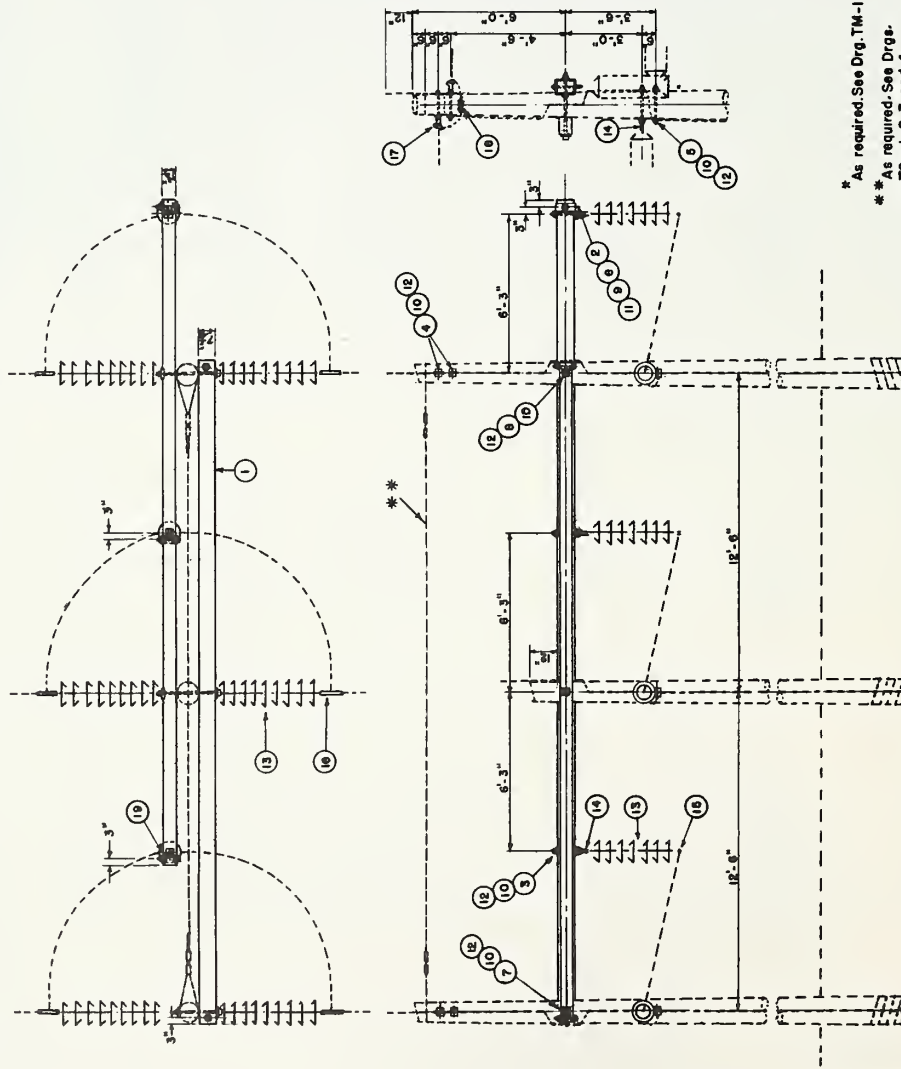
Scale: 1/4"=1'-0"

Date: 11-4-9

1	Revised	8-56	Date:
No	REVISION		

TH-4A

NOTE
 Make one turn of downlead underneath washers around conductor support bolts.



* As required. See Drg. TM-1
 ** As required. See Drgs.
 TG-1, 2, 3, and 4.

*** Crossarm type 55

LIST OF MATERIAL

DRG. REF.	REQD.	DESCRIPTION	ITEM
1	2	5 1/2" x 7 1/4" x 26'-0" Wood Crossarm ***	d
2	8	Reinforcing Plate for 8" Crossarm	eg
3	3	3/4" x 10" Eye Bolt	o
4	4	3/4" x 12" Eye Bolt	o
5	6	3/4" x 14" Eye Bolt	o
6	5	1/2" x 8" Machine Bolt	c
7	1	3/4" x 20" Machine Bolt	c
8	2	3/4" x 26" Machine Bolt	c
9	10	1 3/8" Galv. Round Washer, 9/16" Hole	d
10	30	4 1/4" x 3/16" Galv. Sq. Washer, 13/16" Hole	d
11	5	Locknuts for 1/2" Bolt	ek
12	16	Locknuts for 3/4" Bolt	ek
13	1	5 3/4" x 10" Suspension Insulator	k
14	9	Suspension Hook	eh
15	3	Suspension Clamp and Connecting Piece	ei
16	6	Conductor Dead End Clamp and Connecting Piece	ej
17	4	Ground Wire Dead End Clamp	l
18	2	3 Bolt Clamp - 6" Long	u
19	3	3" x 8" x 30 Go. Copper Strip	

TRANSMISSION LINE DEAD END STRUCTURE
 — KV. THREE POLE DOUBLE DEAD END
 115 KV. MAXIMUM - 12'-6" POLE SPACING

Scale: 1/4" = 1'-0"

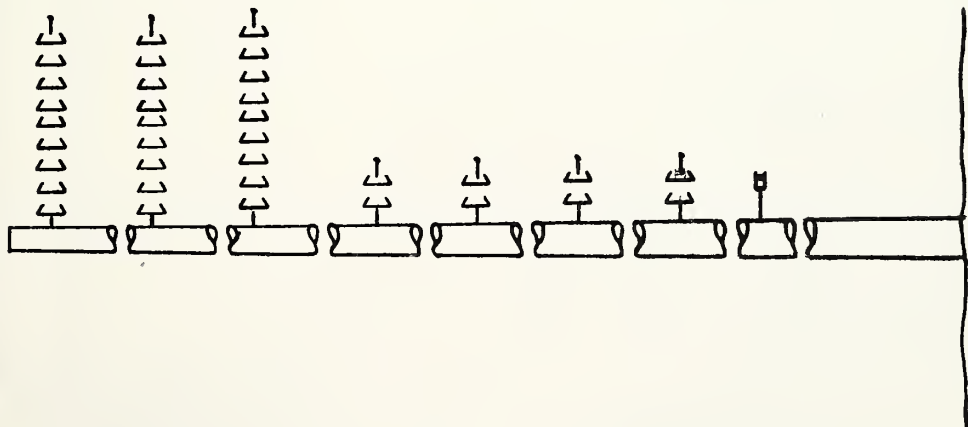
Date: 11-4-3

TH-5A

NOTE Make one turn of downlead underneath washer around conductor support bolts.

No.	Revision	Date
1	Released	8-56

0-1 0-11 0-11 0-6 0-4 0-4 0-4 0-5



TRANSMISSION LINE DEAD END STRUCTURE
115 KV. W/ 24.9 KV. UNDERBUILT
SINGLE POLE DOUBLE DEAD END

DRAWN: S-A-W
73-115

EXHIBIT 10

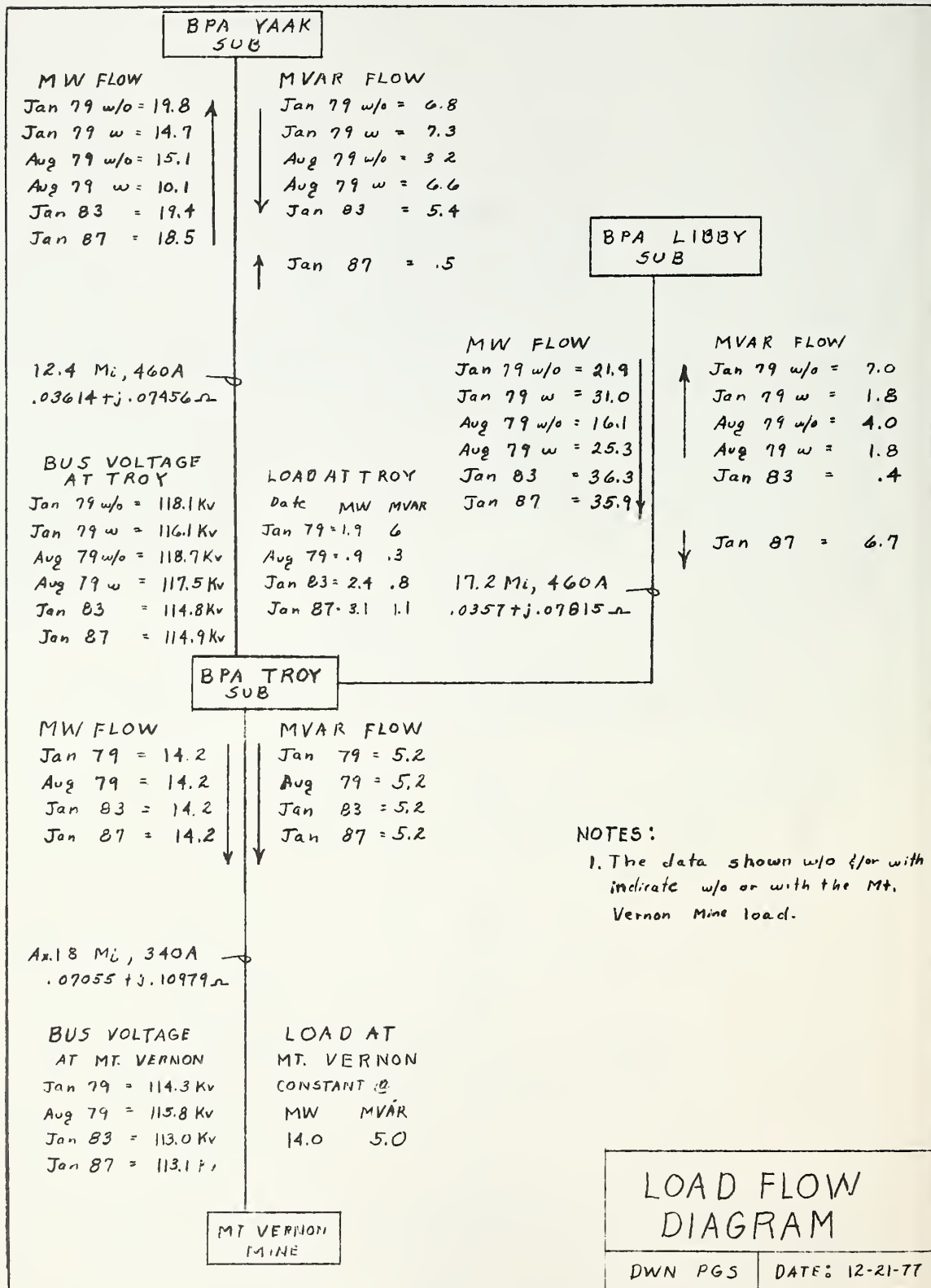


EXHIBIT 11

PROOF OF SERVICE

A copy of the Application has been provided to the following agencies:

County Commissioners, Lincoln County, Libby, Montana 59923
Planning Commission, Lincoln County, Libby, Montana 59923
Mayor, City of Libby, Libby, Montana 59923
Mayor, Town of Troy, Troy, Montana 59936
U. S. Forest Service, Kootenai National Forest, Floyd Marita, Supervisor
Libby, Montana 59923
Montana Department of Fish & Game, Helena, Montana 59601
Montana Department of Lands, Helena, Montana 59601
Montana Department of Health, Helena, Montana 59601
Montana Public Service Commission, Helena, Montana 59601
Montana Department of Highways, Helena, Montana 59601
Lincoln Conservation District, Chet Apeland, Chairman, Box 403
Eureka, Montana 59917

I hereby certify that I have, this day, sent a copy of the application for electric transmission line by Northern Lights, Inc., dated December 29, 1977 by certified mail to the foregoing listed parties.

Dated at Newport Washington this 29th day of December, 1977.

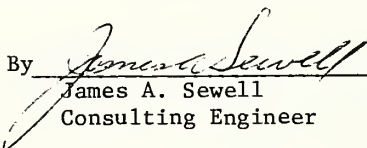
By 
James A. Sewell
Consulting Engineer

EXHIBIT 12

PROOF OF PUBLIC NOTICE

PUBLIC NOTICE

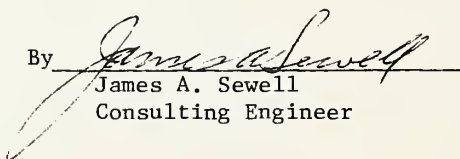
An application has been filed on December 29, 1977, with the Montana Department of Natural Resources and Conservation, Energy Planning Division, Helena, Montana, by Northern Lights, Inc. for permission to construct a 115 Kv transmission line with a 24.9 Kv underbuild part of its length. This transmission line will extend from the Bonneville Power Administration's substation approximately 1 mile east of Troy, Montana southerly along Northern Light's existing distribution line right of way to the proposed access road to the proposed Mt. Vernon mine and generally along said access road to the mine, a total distance of approximately 18 miles. This transmission line is for the purpose of providing power to the proposed Mt. Vernon mine and mill.

Additional information concerning this filing can be obtained from Northern Lights, Inc., P. O. Box 310, Sandpoint, Idaho 83864.

I hereby certify that I have this day sent the above notice to the Western News in Libby, Montana for publication in their next regular issue and have requested a certificate of publication which will be sent to DNRC upon receipt.

Dated at Newport, Washington this 29th day of December, 1977.

By


James A. Sewell
Consulting Engineer

APPENDIX B

TITLE V OF FEDERAL LAND POLICY
AND MANAGEMENT ACT OF 1976

Public Law 94-579 94th Congress

An Act

To establish public land policy; to establish guidelines for its administration; to provide for the management, protection, development, and enhancement of the public lands; and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

TABLE OF CONTENTS

TITLE I—SHORT TITLE; POLICIES; DEFINITIONS

Sec. 101. Short title.
Sec. 102. Declaration of policy.
Sec. 103. Definitions.

TITLE II—LAND USE PLANNING; LAND ACQUISITION AND DISPOSITION

Sec. 201. Inventory and identification.
Sec. 202. Land use planning.
Sec. 203. Sales.
Sec. 204. Withdrawals.
Sec. 205. Exclusions.
Sec. 206. Easements.
Sec. 207. Qualified conveyees.
Sec. 208. Conveyances.
Sec. 209. Reservation and conveyance of mineral interest.
Sec. 210. Coordination with State and local governments.
Sec. 211. Unaffiliated lands.
Sec. 212. Recreation and Public Purposes Act.
Sec. 213. Unaffiliated lands.
Sec. 214. Unintentional Trespass Act.

TITLE III—ADMINISTRATION

Sec. 301. BLM directorate and functions.
Sec. 302. Management of use, occupancy, and development.
Sec. 303. Enforcement authority.
Sec. 304. Service charges and reimbursements.
Sec. 305. Deposits and forfeitures.
Sec. 306. Working capital fund.
Sec. 307. Studies, cooperative agreements, and contributions.
Sec. 308. Contracts for surveys and resource protection.
Sec. 309. Advisory committees and public participation.
Sec. 310. Rules and regulations.
Sec. 311. Program report.
Sec. 312. Search and rescue.
Sec. 313. Sunshine in government.
Sec. 314. Recordation of mining claims and abandonment.
Sec. 315. Recordable disclaimers of interest.
Sec. 316. Recordable conveyance documents.
Sec. 317. Mineral revenues.
Sec. 318. Appropriation authorization.

TITLE IV—RANGE MANAGEMENT

Sec. 401. Grazing fees.
Sec. 402. Grazing leases and permits.
Sec. 403. Grazing advisory boards.
Sec. 404. Management of certain horses and burros.

TITLE V—RIGHTS-OF-WAY

Sec. 501. Authorization to grant rights-of-way.
Sec. 502. Cost-share road authorization.
Sec. 503. Corridors.
Sec. 504. General provisions.
Sec. 505. Terms and conditions.
Sec. 506. Right-of-way for Federal agencies.
Sec. 507. Right-of-way for Federal agencies.
Sec. 508. Conveyance of lands.

Sec. 509. Existing rights-of-way.
Sec. 510. Effect on other laws.
Sec. 511. Coordination of applications.

TITLE VI—DESIGNATED MANAGEMENT AREAS

Sec. 601. California desert conservation area.
Sec. 602. King range.
Sec. 603. Bureau of land management wilderness study.

TITLE VII—EFFECT ON EXISTING RIGHTS; REPEAL OF EXISTING LAWS; SEVERABILITY

Sec. 701. Effect on existing rights.
Sec. 702. Repeal of laws relating to homesteading and small tracts.
Sec. 703. Repeal of laws related to disposals.
Sec. 704. Repeal of withdrawal laws.
Sec. 705. Repeal of laws relating to administration of public lands.
Sec. 706. Repeal of laws relating to rights-of-way.
Sec. 707. Severability.

TITLE V—RIGHTS-OF-WAY

AUTHORIZATION TO GRANT RIGHTS-OF-WAY

43 USC 1761.

SEC. 501. (a) The Secretary, with respect to the public lands and, the Secretary of Agriculture, with respect to lands within the National Forest System (except in each case land designated as wilderness), are authorized to grant, issue, or renew rights-of-way over, upon, under, or through such lands for—

(1) reservoirs, canals, ditches, flumes, laterals, pipes, pipelines, tunnels, and other facilities and systems for the impoundment, storage, transportation, or distribution of water;

(2) pipelines and other systems for the transportation or distribution of liquids and gases; other than water and other than oil, natural gas, synthetic liquid or gaseous fuels, or any refined product produced therefrom; and for storage and terminal facilities in connection therewith;

(3) pipelines, slurry and emulsion systems, and conveyor belts for transportation and distribution of solid materials, and facilities for the storage of such materials in connection therewith;

(4) systems for generation, transmission, and distribution of electric energy, except that the applicant shall also comply with all applicable requirements of the Federal Power Commission under the Federal Power Act of 1935 (49 Stat. 847; 16 U.S.C. 791);

(5) systems for transmission or reception of radio, television, telephone, telegraph, and other electronic signals, and other means of communication;

(6) roads, trails, highways, railroads, canals, tunnels, tramways, airways, livestock driveways, or other means of transportation except where such facilities are constructed and maintained in connection with commercial recreation facilities on lands in the National Forest System; or

(7) such other necessary transportation or other systems or facilities which are in the public interest and which require rights-of-way over, upon, under, or through such lands.

(b) (1) The Secretary concerned shall require, prior to granting, issuing, or renewing a right-of-way, that the applicant submit and disclose those plans, contracts, agreements, or other information reasonably related to the use, or intended use, of the right-of-way, including its effect on competition, which he deems necessary to a determination, in accordance with the provisions of this Act, as to whether a right-of-way shall be granted, issued, or renewed and the terms and conditions which should be included in the right-of-way.

(2) If the applicant is a partnership, corporation, association, or other business entity, the Secretary concerned, prior to granting a right-of-way pursuant to this title, shall require the applicant to disclose the identity of the participants in the entity, whom he deems it necessary to a determination, in accordance with the provisions of this title, as to whether a right-of-way shall be granted, issued, or renewed and the terms and conditions which should be included in the right-of-way. Such disclosures shall include, where applicable: (A) the name and address of each partner; (B) the name and address of each shareholder owning 3 per centum or more of the shares, together with the number and percentage of any class of voting shares of the entity which such shareholder is authorized to vote; and (C) the name and address of each affiliate of the entity together with, in the case of an affiliate

controlled by the entity, the number of shares and the percentage of any class of voting stock of that affiliate owned, directly or indirectly, by that entity, and, in the case of an affiliate which controls that entity, the number of shares and the percentage of any class of voting stock of that entity owned, directly or indirectly, by the affiliate.

COST-SHARE ROAD AUTHORIZATION

43 USC 1762.

SEC. 502. (a) The Secretary, with respect to the public lands, is authorized to provide for the acquisition, construction, and maintenance of roads within and near the public lands in locations and according to specifications which will permit maximum economy in harvesting timber from such lands tributary to such roads and at the same time meet the requirements for protection, development, and management of such lands for utilization of the other resources thereof. Financing of such roads may be accomplished (1) by the Secretary utilizing appropriated funds, (2) by requirements on purchasers of timber and other products from the public lands, including provisions for amortization of road costs in contracts, (3) by cooperative financing with other public agencies and with private agencies or persons, or (4) by a combination of these methods: *Provided*, That, where roads of a higher standard than that needed in the harvesting and removal of the timber and other products covered by the particular sale are to be constructed, the purchaser of timber and other products from public lands shall not, except when the provisions of the second proviso of this subsection apply, be required to bear that part of the costs necessary to meet such higher standard, and the Secretary is authorized to make such arrangements to this end as may be appropriate: *Provided further*, That when timber is offered with the condition that the purchaser thereof will build a road or roads in accordance with standards specified in the offer, the purchaser of the timber will be responsible for paying the full costs of construction of such roads.

(b) Copies of all instruments affecting permanent interests in land executed pursuant to this section shall be recorded in each county where the lands are located.

Maintenance.

(c) The Secretary may require the user or users of a road, trail, land, or other facility administered by him through the Bureau, including purchasers of Government timber and other products, to maintain such facilities in a satisfactory condition commensurate with the particular use requirements of each. Such maintenance to be borne by each user shall be proportionate to total use. The Secretary may also require the user or users of such a facility to reconstruct the same when such reconstruction is determined to be necessary to accommodate such use. If such maintenance or reconstruction cannot be so provided or if the Secretary determines that maintenance or reconstruction by a user would not be practical, then the Secretary may require that sufficient funds be deposited by the user to provide his portion of such total maintenance or reconstruction. Deposits made to cover the maintenance or reconstruction of roads are hereby made available until expended to cover the cost to the United States of accomplishing the purposes for which deposited: *Provided*, That deposits received for work on adjacent and overlapping areas may be combined when it is the most practicable and efficient manner of performing the work, and cost thereof may be determined by estimates: *And provided further*, That unexpended balances upon accomplishment of the purpose for which deposited shall be transferred to miscellaneous receipts or refunded.

(d) Whenever the agreement under which the United States has obtained for the use of, or in connection with, the public lands a right-

of-way or easement for a road or an existing road or the right to use an existing road provides for delayed payments to the Government's grantor, any fees or other collections received by the Secretary for the use of the road may be placed in a fund to be available for making payments to the grantor.

RIGHT-OF-WAY CORRIDORS

Sec. 503. In order to minimize adverse environmental impacts and the proliferation of separate rights-of-way, the utilization of rights-of-way in common shall be required to the extent practical, and each right-of-way or permit shall reserve to the Secretary concerned the right to grant additional rights-of-way or permits for compatible uses on or adjacent to rights-of-way granted pursuant to this Act. In designating right-of-way corridors and in determining whether to require that rights-of-way be confined to them, the Secretary concerned shall take into consideration national and State land use policies, environmental quality, economic efficiency, national security, safety, and good engineering and technological practices. The Secretary concerned shall issue regulations containing the criteria and procedures he will use in designating such corridors. Any existing transportation and utility corridors may be designated as transportation and utility corridors pursuant to this subsection without further review.

Regulations.

GENERAL PROVISIONS

Sec. 504. (a) The Secretary concerned shall specify the boundaries of each right-of-way as precisely as is practical. Each right-of-way shall be limited to the ground which the Secretary concerned determines (1) will be occupied by facilities which constitute the project for which the right-of-way is granted, issued, or renewed, (2) to be necessary for the operation or maintenance of the project, (3) to be necessary to protect the public safety, and (4) will do no unnecessary damage to the environment. The Secretary concerned may authorize the temporary use of such additional lands as he determines to be reasonably necessary for the construction, operation, maintenance, or termination of the project or a portion thereof, or for access thereto. (b) Each right-of-way or permit granted, issued, or renewed pursuant to this section shall be limited to a reasonable term in light of all circumstances concerning the project. In determining the duration of a right-of-way the Secretary concerned shall, among other things, take into consideration the cost of the facility, its useful life, and any public purpose it serves. The right-of-way shall specify whether it is or is not renewable and the terms and conditions applicable to the renewal.

(c) Rights-of-way shall be granted, issued, or renewed pursuant to this title under such regulations or stipulations, consistent with the provisions of this title or any other applicable law, and shall also be subject to such terms and conditions as the Secretary concerned may prescribe regarding extent, duration, survey, location, construction, maintenance, transfer or assignment, and termination.

(d) The Secretary concerned prior to granting or issuing a right-of-way pursuant to this title for a new project which may have a significant impact on the environment, shall require the applicant to submit a plan of construction, operation, and rehabilitation for such right-of-way which shall comply with stipulations or with regulations issued by that Secretary, including the terms and conditions required under section 505 of this Act.

43 USC 1763.

43 USC 1764.

Limitation.

Right-of-way,
plan submitted.

Regulations.

(e) The Secretary concerned shall issue regulations with respect to the terms and conditions that will be included in rights-of-way pursuant to section 505 of this title. Such regulations shall be regularly revised as needed. Such regulations shall be applicable to every right-of-way granted or issued pursuant to this title and to any subsequent renewal thereof, and may be applicable to rights-of-way not granted or issued, but renewed pursuant to this title.

(f) Mineral and vegetative materials, including timber, within or without a right-of-way, may be used or disposed of in connection with construction or other purposes only if authorization to remove or use such materials has been obtained pursuant to applicable laws.

Fair market
value, annual
payment.

(g) The holder of a right-of-way shall pay annually in advance the fair market value hereof as determined by the Secretary granting, issuing, or renewing such right-of-way: *Provided*, That when the annual rental is less than \$100, the Secretary concerned may require advance payment for more than one year at a time: *Provided further*, That the Secretary concerned may waive rentals where a right-of-way is granted, issued, or renewed in reciprocity for a right-of-way conveyed to the United States in connection with a cooperative cost share program between the United States and the holder. The Secretary concerned may, by regulation or prior to promulgation of such regulations, as a condition of a right-of-way, require an applicant for or holder of a right-of-way to reimburse the United States for all reasonable administrative and other costs incurred in processing an application for such right-of-way and in inspection and monitoring of construction, operation, and termination of the facility pursuant to such right-of-way: *Provided, however*, That the Secretary concerned need not secure reimbursement in any situation where there is in existence a cooperative cost share right-of-way program between the United States and the holder of a right-of-way. Rights-of-way may be granted, issued, or renewed to a Federal, State, or local government or any agency or instrumentality thereof, to nonprofit associations or nonprofit corporations which are not themselves controlled or owned by profitmaking corporations or business enterprises, or to a holder where he provides without or at reduced charges a valuable benefit to the public or to the programs of the Secretary concerned, or to a holder in connection with the authorized use or occupancy of Federal land for which the United States is already receiving compensation for such lesser charge, including fire use as the Secretary concerned finds equitable and in the public interest. Such rights-of-way issued at less than fair market value are not assignable except with the approval of the Secretary issuing the right-of-way. The moneys received for reimbursement of reasonable costs shall be deposited with the Treasury in a special account and are hereby authorized to be appropriated and made available until expended.

Reimbursement.

(h) (1) The Secretary concerned shall promulgate regulations specifying the extent to which holders of rights-of-way under this title shall be liable to the United States for damages or injury incurred by the United States caused by the use and occupancy of the rights-of-way. The regulations shall also specify the extent to which such holders shall indemnify or hold harmless the United States for liabilities, damages, or claims caused by their use and occupancy of the rights-of-way. (2) Any regulation or stipulation imposing liability without fault shall include a maximum limitation on damages commensurate with the foreseeable risks or hazards presented. Any liability for damage

Regulations.

(i) The Secretary concerned shall promulgate regulations specifying the extent to which holders of rights-of-way under this title shall be liable to the United States for damages or injury incurred by the United States caused by the use and occupancy of the rights-of-way. The regulations shall also specify the extent to which such holders shall indemnify or hold harmless the United States for liabilities, damages, or claims caused by their use and occupancy of the rights-of-way.

(j) Any regulation or stipulation imposing liability without fault shall include a maximum limitation on damages commensurate with the foreseeable risks or hazards presented. Any liability for damage

or injury in excess of this amount shall be determined by ordinary rules of negligence.

(i) Where he deems it appropriate, the Secretary concerned may require a holder of a right-of-way to furnish a bond, or other security, satisfactory to him to secure all or any of the obligations imposed by the terms and conditions of the right-of-way or by any rule or regulation of the Secretary concerned.

(j) The Secretary concerned shall grant, issue, or renew a right-of-way under this title only when he is satisfied that the applicant has the technical and financial capability to construct the project for which the right-of-way is requested, and in accord with the requirements of this title.

TERMS AND CONDITIONS

SEC. 505. Each right-of-way shall contain—

- (a) terms and conditions which will (i) carry out the purposes of this Act and rules and regulations issued thereunder; (ii) minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment; (iii) require compliance with applicable air and water quality standards established by or pursuant to applicable Federal or State law; and (iv) require compliance with State standards for public health and safety, environmental protection, and siting, construction, operation, and maintenance of or for rights-of-way for similar purposes if those standards are more stringent than applicable Federal standards; and
- (b) such terms and conditions as the Secretary concerned deems necessary to (i) protect Federal property and economic interests; (ii) manage efficiently the lands which are subject to the right-of-way or adjacent thereto and protect the other lawful users of the lands adjacent to or traversed by such right-of-way; (iii) protect lives and property; (iv) protect the interests of individuals living in the general area traversed by the right-of-way who rely on the fish, wildlife, and other biotic resources of the area for subsistence purposes; (v) require location of the right-of-way along a route that will cause least damage to the environment, taking into consideration feasibility and other relevant factors; and (vi) otherwise protect the public interest in the lands traversed by the right-of-way or adjacent thereto.

SUSPENSION OR TERMINATION OF RIGHTS-OF-WAY

SEC. 506. Abandonment of a right-of-way or noncompliance with any provision of this title, condition of the right-of-way, or applicable rule or regulation of the Secretary concerned may be grounds for suspension or termination of the right-of-way if, after due notice to the holder of the right-of-way and with respect to easements, an appropriate administrative proceeding pursuant to section 534 of title 5 of the United States Code, the Secretary concerned determines that any such ground exists and that suspension or termination is justified. No administrative proceeding shall be required where the right-of-way by its terms provides that it terminates on the occurrence of a fixed or agreed-upon condition, event, or time. If the Secretary concerned determines that an immediate temporary suspension of activities within a right-of-way for violation of its terms and conditions is necessary to protect public health or safety or the environment, he may abate such activities prior to an administrative proceeding. Prior to commencing any proceeding to suspend or terminate a right-of-way

Notice.

the Secretary concerned shall give written notice to the holder of the grounds for such action and shall give the holder a reasonable time to resume use of the right-of-way or to comply with this title, condition, rule, or regulation as the case may be. Failure of the holder of the right-of-way to use the right-of-way for the purpose for which it was granted, issued, or renewed, for any continuous five-year period, shall constitute a rebuttable presumption of abandonment of the right-of-way except that where the failure of the holder to use the right-of-way for the purpose for which it was granted, issued, or renewed for any continuous five-year period is due to circumstances not within the holder's control, the Secretary concerned is not required to commence proceedings to suspend or terminate the right-of-way.

RIGHTS-OF-WAY FOR FEDERAL AGENCIES

SEC. 507. (a) The Secretary concerned may provide under applicable provisions of this title for the use of any department or agency of the United States a right-of-way over, upon, under or through the land administered by him, subject to such terms and conditions as he may impose.

43 USC 1767.

(b) Where a right-of-way has been reserved for the use of any department or agency of the United States, the Secretary shall take no action to terminate, or otherwise limit, that use without the consent of the head of such department or agency.

CONVEYANCE OF LANDS

SEC. 508. If under applicable law the Secretary concerned decides to transfer out of Federal ownership any lands covered in whole or in part by a right-of-way, including a right-of-way granted under the Act of November 16, 1973 (87 Stat. 576; 30 U.S.C. 185), the lands may be conveyed subject to the right-of-way; however, if the Secretary concerned determines that retention of Federal control over the right-of-way is necessary to assure that the purposes of this title will be carried out, the terms and conditions of the right-of-way complied with, or the lands protected, he shall (a) reserve to the United States that portion of the lands which lies within the boundaries of the right-of-way, or (b) convey the lands, including that portion within the boundaries of the right-of-way, subject to the right-of-way and reserving to the United States the right to enforce all or any of the terms and conditions of the right-of-way, including the right to renew it or extend it upon its termination and to collect rents.

43 USC 1768.

EXISTING RIGHTS-OF-WAY

SEC. 509. (a) Nothing in this title shall have the effect of terminating any right-of-way or right-of-use heretofore issued, granted, or permitted. However, with the consent of the holder thereof, the Secretary concerned may cancel such a right-of-way or right-of-use and in its stead issue a right-of-way pursuant to the provisions of this title.

43 USC 1769.

Cancellation.

(b) When the Secretary concerned issues a right-of-way under this title for a railroad and appurtenant communication facilities in connection with a realignment of a railroad on lands under his jurisdiction by virtue of a right-of-way granted by the United States, he may, when he considers it to be in the public interest and the lands involved are not within an incorporated community and are of approximately equal value, notwithstanding the provisions of this title, provide in the new right-of-way of the same terms and conditions as applied to the por-

tion of the existing right-of-way relinquished to the United States with respect to the payment of annual rental, duration of the right-of-way, and the nature of the interest in lands granted. The Secretary concerned or his delegate shall take final action upon all applications for the grant, issue, or renewal of rights-of-way under subsection (b) of this section no later than six months after receipt from the applicant of all information required from the applicant by this title.

EFFECT ON OTHER LAWS

43 USC 1770.

Sec. 510. (a) Effective on and after the date of approval of this Act, no right-of-way for the purposes listed in this title shall be granted, issued, or renewed over, upon, under, or through such lands except under and subject to the provisions, limitations, and conditions of this title: *Provided*, That nothing in this title shall be construed as affecting or modifying the provisions of the Act of October 13, 1964 (78 Stat. 1089; 16 U.S.C. 532-538) and in the event of conflict with, or inconsistency between, this title and the Act of October 13, 1964, the latter shall prevail: *Provided further*, That nothing in this Act should be construed as making it mandatory that, with respect to forest roads, the Secretary of Agriculture limit rights-of-way grants or their term of years or require disclosure pursuant to Section 501(b) or impose any other condition contemplated by this Act that is contrary to present practices of that Secretary under the Act of October 13, 1964. Any pending application for a right-of-way under any other law on the effective date of this section shall be considered as an application under this title. The Secretary concerned may require the applicant to submit any additional information he deems necessary to comply with the requirements of this title.

(b) Nothing in this title shall be construed to preclude the use of lands covered by this title for highway purposes pursuant to sections 107 and 317 of title 23 of the United States Code.

(c) (1) Nothing in this title shall be construed as exempting any holder of a right-of-way issued under this title from any provision of the antitrust laws of the United States.

(2) For the purposes of this subsection, the term "antitrust laws" includes the Act of July 9, 1890 (26 Stat. 15 U.S.C. 1 et seq.); the Act of October 15, 1914 (38 Stat. 730; 15 U.S.C. 12 et seq.); the Federal Trade Commission Act (38 Stat. 717; 15 U.S.C. 41 et seq.); and sections 73 and 74 of the Act of August 27, 1894.

"Antitrust law."

15 USC 8, 9.

COORDINATION OF APPLICATIONS

43 USC 1771.

Sec. 511. Applicants before Federal departments and agencies other than the Department of the Interior or Agriculture seeking a license, certificate, or other authority for a project which involve a right-of-way over, upon, under, or through public land or National Forest System lands must simultaneously apply to the Secretary concerned for the appropriate authority to use public lands or National Forest System lands and submit to the Secretary concerned all information furnished to the other Federal department or agency.

APPENDIX C

ASSESSMENT OF ENVIRONMENTAL FACTORS INCLUDED IN THE MAJOR FACILITY SITING ACT

The Montana Major Facility Siting Act stipulates that (Section 70-816, R.C.M. 1947): "In evaluating long-range plans, conducting five-year site reviews, and evaluating applications for certificates, the board and department shall give consideration to the following list of environmental factors...." In the following table, the list of environmental factors given in the Act is reproduced and their applicability to the present application explained. Under the column headed "Disposition," each entry is either a number (which refers to the page in this EIS on which the discussion of the indicated environmental factors occurs or begins) or one of the following abbreviations: NA (not applicable to the proposed transmission line) or NS (no significant impact expected from the proposed transmission line).

Environmental Factor	Disposition
<hr/> Energy Needs <hr/>	
(a) Growth in demand and projections of need	19
(b) Availability and desirability of alternative sources of energy	25
(c) Availability and desirability of alternative sources of energy in lieu of the proposed facility	25
(d) Promotional activities of the utility which may have given rise to the need for this facility	NA
(e) Socially beneficial uses of the output of this facility, including its uses to protect or enhance environmental quality	NA
(f) Conservation activities which could reduce the need for more energy	NA
(g) Research activities of the utility of new technology available to it which might minimize environmental impact	NA

Environmental Factor	Disposition
Land Use Impacts	
(a) Area of land required and ultimate use	8
(b) Consistency with areawide state and regional land use plans	50
(c) Consistency with existing and projected nearby land use	46
(d) Alternative uses of the site	29, 46
(e) Impact on population already in the area; population attracted by construction or operation of the facility itself; impact of availability of energy from this facility on growth patterns and population dispersal.	36
(f) Geologic suitability of the site or route	59
(g) Seismologic characteristics	59
(h) Construction practices	11, 85
(i) Extent of erosion, scouring, wasting of land--both at site and as a result of fossil fuel demands of the facility	29, 44, 63
(j) Corridor design and construction precautions for transmission lines or aqueducts	30, 36, 44, 50, 53, 58
(k) Scenic impacts	53
(l) Effects on natural systems, wildlife, plant life	29, 44, 57
(m) Impacts on important historic architectural, archeological, and cultural areas and features	43
(n) Extent of recreation opportunities and related compatible uses	50
(o) Public recreation plan for the project	NA
(p) Public facilities and accommodation	NA
(q) Opportunities for joint use with energy intensive industries, or other activities to utilize the waste heat from facilities	NA

Environmental Factor	Disposition
Water Resources Impacts	
(a) Hydrologic studies of adequacy of water supply and impact of facility on stream flow, lakes and reservoirs	NS
(b) Hydrologic studies of impact of facilities on ground water	NS
(c) Cooling system evaluation including consideration of alternatives	NA
(d) Inventory of effluents including physical, chemical, biological, and radiological characteristics	NA
(e) Hydrologic studies of effects of effluents on receiving waters, including mixing characteristics of receiving waters, changed evaporation due to temperature differentials, and effect of discharge on bottom sediments	NA
(f) Relationship to water quality standards	NA
(g) Effects of changes in quantity and quality on water use by others, including both withdrawal and in situ uses; relationship to projected uses; relationship to water rights	NA
(h) Effects on plant and animal life, including algae, macroinvertebrates, and fish population	57
(i) Effects on unique or otherwise significant ecosystems; e.g., wetlands	44
(j) Monitoring programs	NA
Air Quality Impacts	
(a) Meteorology, wind direction and velocity, ambient temperature ranges, precipitation values, inversion occurrence, other effects on dispersion	NA
(b) Topography, factors affecting dispersion	NA
(c) Standards in effect and projected for emissions, design capability to meet standards	NA

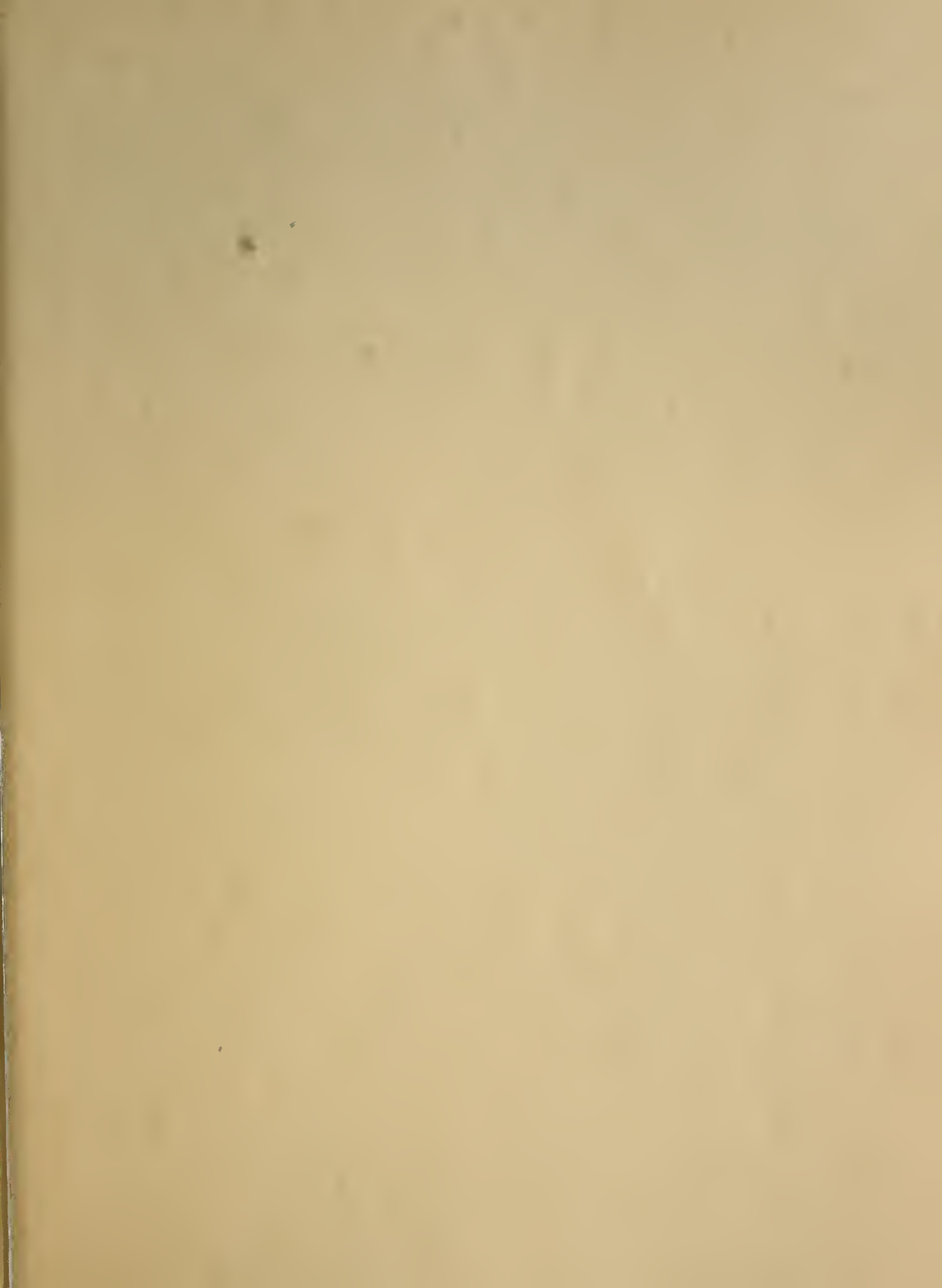
Environmental Factor	Disposition
Air Quality Impacts (Continued)	
(d) Emissions and controls	NA
(i) Stack design	
(ii) Particulates	
(iii) Sulfur Oxides	
(iv) Oxides of nitrogen	
(v) Heavy metals, trace elements, radioactive materials and other toxic substances	
(e) Relationship to present and projected air quality of the area	NA
(f) Monitoring program	NA
Solid Wastes Impact	
(a) Solid waste inventory	NA
(b) Disposal program	NA
(c) Relationship of disposal practices to environmental quality criteria	NA
(d) Capacity of disposal sites to accept projected waste loadings	NA
Radiation Impacts	
(a) Land-use controls over development and population	NA
(b) Wastes and associated disposal program for solid, liquid, radioactive and gaseous wastes	NA
(c) Analyses and studies of the adequacy of engineering safeguards and operating procedures	NA
(d) Monitoring, adequacy of devices and sampling techniques	NA
Noise Impacts	
(a) Construction period levels	NS
(b) Operational levels	NS

Environmental Factor	Disposition
Noise Impacts (Continued)	
(c) Relationship of present and projected noise levels to existing and potential stricter noise standards	NA
(d) Monitoring, adequacy of devices and methods	NA

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